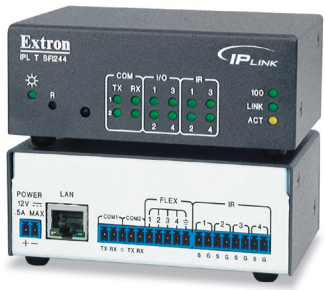
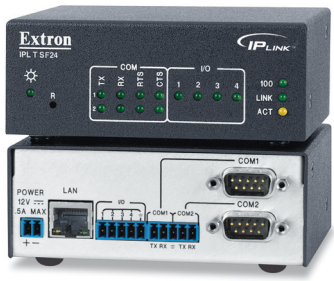
Extron® Electronics

INTERFACING, SWITCHING AND DISTRIBUTION

User's Manual





IPL T SF Series

IP Link® Ethernet Control Interfaces

68-738-06 **Rev. B**
12 08

Precautions

Safety Instructions • English

This symbol is intended to alert the user of important operating and maintenance (servicing) instructions in the literature provided with the equipment.

This symbol is intended to alert the user of the presence of uninsulated dangerous voltage within the product's enclosure that may present a risk of electric shock.

Caution

Read Instructions • Read and understand all safety and operating instructions before using the equipment.

Retain Instructions • The safety instructions should be kept for future reference.

Follow Warnings • Follow all warnings and instructions marked on the equipment or in the user information.

Avoid Attachments • Do not use tools or attachments that are not recommended by the equipment manufacturer because they may be hazardous.

Consignes de Sécurité • Français

Ce symbole sert à avertir l'utilisateur que la documentation fournie avec le matériel contient des instructions importantes concernant l'exploitation et la maintenance (réparation).

Ce symbole sert à avertir l'utilisateur de la présence dans le boîtier de l'appareil de tensions dangereuses non isolées posant des risques d'électrocution.

Attention

Lire les instructions• Prendre connaissance de toutes les consignes de sécurité et d'exploitation avant d'utiliser le matériel.

Conserver les instructions• Ranger les consignes de sécurité afin de pouvoir les consulter à l'avenir.

Respecter les avertissements • Observer tous les avertissements et consignes marqués sur le matériel ou présentés dans la documentation utilisateur.

Eviter les pièces de fixation • Ne pas utiliser de pièces de fixation ni d'outils non recommandés par le fabricant du matériel car cela risquerait de poser certains dangers.

Sicherheitsanleitungen • Deutsch

Dieses Symbol soll dem Benutzer in der im Lieferumfang enthaltenen Dokumentation besonders wichtige Hinweise zur Bedienung und Wartung (Instandhaltung) geben.

Dieses Symbol soll den Benutzer darauf aufmerksam machen, daß im Inneren des Gehäuses dieses Produktes gefährliche Spannungen, die nicht isoliert sind und die einen elektrischen Schock verursachen können, herrschen.

Achtung

Lesen der Anleitungen • Bevor Sie das Gerät zum ersten Mal verwenden, sollten Sie alle Sicherheits-und Bedienungsanleitungen genau durchlesen und verstehen.

Aufbewahren der Anleitungen • Die Hinweise zur elektrischen Sicherheit des Produktes sollten Sie aufbewahren, damit Sie im Bedarfsfall darauf zurückgreifen können.

Befolgen der Warnhinweise • Befolgen Sie alle Warnhinweise und Anleitungen auf dem Gerät oder in der Benutzerdokumentation.

Keine Zusatzgeräte • Verwenden Sie keine Werkzeuge oder Zusatzgeräte, die nicht ausdrücklich vom Hersteller empfohlen wurden, da diese eine Gefahrenquelle darstellen können.

Instrucciones de seguridad • Español

Este símbolo se utiliza para advertir al usuario sobre instrucciones importantes de operación y mantenimiento (o cambio de partes) que se desean destacar en el contenido de la documentación suministrada con los equipos.

Este símbolo se utiliza para advertir al usuario sobre la presencia de elementos con voltaje peligroso sin protección aislante, que puedan encontrarse dentro de la caja o alojamiento del producto, y que puedan representar riesgo de electrocución.

Precaucion

Leer las instrucciones • Leer y analizar todas las instrucciones de operación y seguridad, antes de usar el equipo.

Conservar las instrucciones • Conservar las instrucciones de seguridad para futura consulta.

Obedecer las advertencias • Todas las advertencias e instrucciones marcadas en el equipo o en la documentación del usuario, deben ser obedecidas.

Evitar el uso de accesorios • No usar herramientas o accesorios que no sean especificamente recomendados por el fabricante, ya que podrian implicar riesgos.

Warning

Power sources • This equipment should be operated only from the power source indicated on the product. This equipment is intended to be used with a main power system with a grounded (neutral) conductor. The third (grounding) pin is a safety feature, do not attempt to bypass or disable it.

Power disconnection • To remove power from the equipment safely, remove all power cords from the rear of the equipment, or the desktop power module (if detachable), or from the power source receptacle (wall plug).

Power cord protection • Power cords should be routed so that they are not likely to be stepped on or pinched by items placed upon or against them.

Servicing • Refer all servicing to qualified service personnel. There are no user-serviceable parts inside. To prevent the risk of shock, do not attempt to service this equipment yourself because opening or removing covers may expose you to dangerous voltage or other hazards.

Slots and openings • If the equipment has slots or holes in the enclosure, these are provided to prevent overheating of sensitive components inside. These openings must never be blocked by other objects.

Lithium battery • There is a danger of explosion if battery is incorrectly replaced. Replace it only with the same or equivalent type recommended by the manufacturer. Dispose of used batteries according to the manufacturer's instructions.

Avertissement

Alimentations• Ne faire fonctionner ce matériel qu'avec la source d'alimentation indiquée sur l'appareil. Ce matériel doit être utilisé avec une alimentation principale comportant un fil de terre (neutre). Le troisième contact (de mise à la terre) constitue un dispositif de sécurité : n'essayez pas de la contourner ni de la désactiver.

Déconnexion de l'alimentation• Pour mettre le matériel hors tension sans danger, déconnectez tous les cordons d'alimentation de l'arrière de l'appareil ou du module d'alimentation de bureau (s'il est amovible) ou encore de la prise secteur.

Protection du cordon d'alimentation • Acheminer les cordons d'alimentation de manière à ce que personne ne risque de marcher dessus et à ce qu'ils ne soient pas écrasés ou pincés par des objets.

Réparation-maintenance • Faire exécuter toutes les interventions de réparation-maintenance par un technicien qualifié. Aucun des éléments internes ne peut être réparé par l'utilisateur. Afin d'éviter tout danger d'électrocution, l'utilisateur ne doit pas essayer de procéder lui-même à ces opérations car l'ouverture ou le retrait des couvercles risquent de l'exposer à de hautes tensions et autres dangers.

Fentes et orifices • Si le boîtier de l'appareil comporte des fentes ou des orifices, ceux-ci servent à empêcher les composants internes sensibles de surchauffer. Ces ouvertures ne doivent jamais être bloquées par des objets.

Lithium Batterie • Il a danger d'explosion s'll y a remplacment incorrect de la batterie. Remplacer uniquement avec une batterie du meme type ou d'un ype equivalent recommande par le constructeur. Mettre au reut les batteries usagees conformement aux instructions du fabricant.

Vorsicht

Stromquellen • Dieses Gerät sollte nur über die auf dem Produkt angegebene Stromquelle betrieben werden. Dieses Gerät wurde für eine Verwendung mit einer Hauptstromleitung mit einem geerdeten (neutralen) Leiter konzipiert. Der dritte Kontakt ist für einen Erdanschluß, und stellt eine Sicherheitsfunktion dar. Diese sollte nicht umgangen oder außer Betrieb gesetzt werden.

Stromunterbrechung • Um das Gerät auf sichere Weise vom Netz zu trennen, sollten Sie alle Netzkabel aus der Rückseite des Gerätes, aus der externen Stomversorgung (falls dies möglich ist) oder aus der Wandsteckdose ziehen.

Schutz des Netzkabels • Netzkabel sollten stets so verlegt werden, daß sie nicht im Weg liegen und niemand darauf treten kann oder Objekte darauf- oder unmittelbar dagegengestellt werden können.

Wartung • Alle Wartungsmaßnahmen sollten nur von qualifiziertem Servicepersonal durchgeführt werden. Die internen Komponenten des Gerätes sind wartungsfrei. Zur Vermeidung eines elektrischen Schocks versuchen Sie in keinem Fall, dieses Gerät selbst öffnen, da beim Entfernen der Abdeckungen die Gefahr eines elektrischen Schlags und/oder andere Gefahren bestehen.

Schlitze und Öffnungen • Wenn das Gerät Schlitze oder Löcher im Gehäuse aufweist, dienen diese zur Vermeidung einer Überhitzung der empfindlichen Teile im Inneren. Diese Öffnungen dürfen niemals von anderen Objekten blockiert werden.

Litium-Batterie • Explosionsgefahr, falls die Batterie nicht richtig ersetzt wird. Ersetzen Sie verbrauchte Batterien nur durch den gleichen oder einen vergleichbaren Batterietyp, der auch vom Hersteller empfohlen wird. Entsorgen Sie verbrauchte Batterien bitte gemäß den Herstelleranweisungen.

Advertencia

Alimentación eléctrica • Este equipo debe conectarse únicamente a la fuente/tipo de alimentación eléctrica indicada en el mismo. La alimentación eléctrica de este equipo debe provenir de un sistema de distribución general con conductor neutro a tierra. La tercera pata (puesta a tierra) es una medida de seguridad, no puentearia ni eliminaria.

Desconexión de alimentación eléctrica • Para desconectar con seguridad la acometida de alimentación eléctrica al equipo, desenchufar todos los cables de alimentación en el panel trasero del equipo, o desenchufar el módulo de alimentación (si fuera independiente), o desenchufar el cable del receptáculo de la pared.

Protección del cables de alimentación • Los cables de alimentación eléctrica se deben instalar en lugares donde no sean pisados ni apretados por objetos que se puedan apoyar sobre ellos.

Reparaciones/mantenimiento • Solicitar siempre los servicios técnicos de personal calificado. En el interior no hay partes a las que el usuario deba acceder. Para evitar riesgo de electrocución, no intentar personalmente la reparación/mantenimiento de este equipo, ya que al abrir o extraer las tapas puede quedar expuesto a voltajes peligrosos u otros riesgos.

Ranuras y aberturas • Si el equipo posee ranuras o orificios en su caja/alojamiento, es para evitar el sobrecalientamiento de componentes internos sensibles. Estas aberturas nunca se deben obstruir con otros objetos.

Batería de litio • Existe riesgo de explosión si esta batería se coloca en la posición incorrecta. Cambiar esta batería únicamente con el mismo tipo (o su equivalente) recomendado por el fabricante. Desachar las baterías usadas siguiendo las instrucciones del fabricante.

安全须知 • 中文

这个符号提示用户该设备用户手册中有重要的操作和维护说明。

这个符号警告用户该设备机壳内有暴露的危险电压，有触电危险。

注意

阅读说明书 • 用户使用该设备前必须阅读并理解所有安全和使用说明。

保存说明书 • 用户应保存安全说明书以备将来使用。

遵守警告 • 用户应遵守产品和用户指南上的所有安全和操作说明。

避免追加 • 不要使用该产品厂商没有推荐的工具或追加设备，以避免危险。

警告

电源 • 该设备只能使用产品上标明的电源。 设备必须使用有地线的供电系统供电。 第三条线（地线）是安全设施，不能不用或跳过。

拔掉电源 • 为安全地从设备拔掉电源，请拔掉所有设备后或桌面电源的电源线，或任何接到市电系统的电源线。

电源线保护 • 妥善布线， 避免被踩踏，或重物挤压。

维护 • 所有维修必须由认证的维修人员进行。 设备内部没有用户可以更换的零件。为避免出现触电危险不要自己试图打开设备盖子维修该设备。

通风孔 • 有些设备机壳上有通风槽或孔，它们是用来防止机内敏感元件过热。 不要用任何东西挡住通风孔。

锂电池 • 不正确的更换电池会有爆炸的危险。 必须使用与厂家推荐的相同或相近型号的电池。 按照生产厂的建议处理废弃电池。

声明

所使用电源为 A 级产品，在生活环境中，该产品可能会造成无线电干扰。在这种情况下，可能需要用户对其干扰采取切实可行的措施。

FCC Class A Notice

This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) this device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation. The Class A limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference, in which case the user will be required to correct the interference at his own expense.

This page has been intentionally left blank.

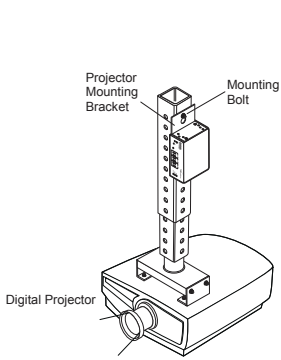
Quick Start Guide — IPL T SF Series

Step 1

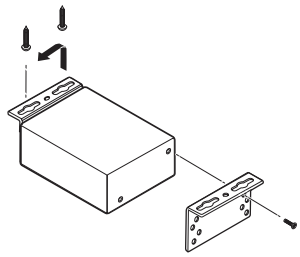
Turn power off and disconnect the device from its power source.

Step 2

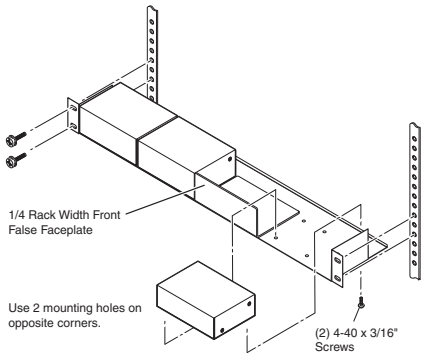
Mount the IPL T SF interface, on a device, under a desktop, or on a rack shelf, as illustrated below.



Projector Mount



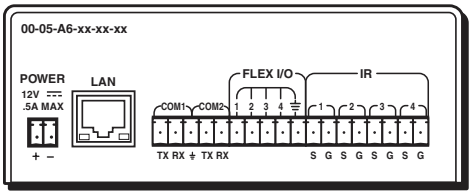
Under Desk



Rack Mount

Step 3

Attach the Local Area Network (LAN) cable from a host PC, switch, hub, or router to the IPLT SF unit. See "Ethernet connection" in chapter 3 for more information on this connection.



Extron IPL T SFI244 Ethernet Control Interface

Step 4

Attach the serial communication cables from the IPL T SF unit to the devices being controlled.

Step 5

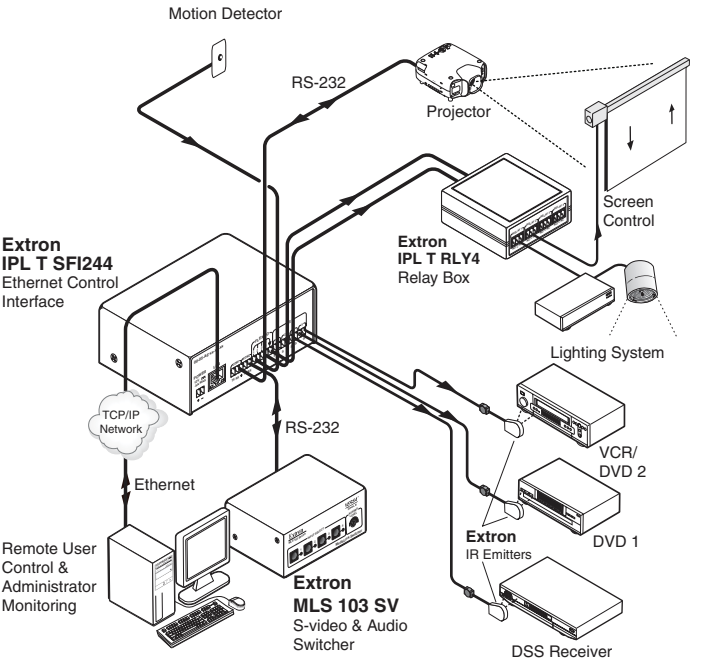
Connect power cords and turn on the equipment in the following order: output devices (projectors, monitors, speakers), the IPL T SF interface, the serial controller or PC, then all input devices (DSS, cable boxes, etc.).

Step 6

Configure the IPL T SF interface using the ARP command. Refer to "IPL T SF interface configuration" in chapter 3 for more information.

Step 7

Communicate with the IPL T SF interface via the default Web pages. Refer to "Communication with the interface" in chapter 4 for more information.



Typical connection setup (IPL T SFI244 shown)

Table of Contents

Chapter One • Introduction 1-1

About this Manual 1-2

About the IPL T SF Interfaces 1-2

Features 1-3

Chapter Two • Installation and Operation 2-1

Installation Overview 2-2

Mounting the IPL T SF Interface 2-2

UL guidelines for rack mounting 2-2

Rack mounting 2-3

Furniture or projector mounting 2-4

Rear Panel Features and Cabling 2-5

Power 2-6

Ethernet/LAN 2-6

Serial communication 2-7

Identification 2-8

Operation 2-9

Front panel indicators 2-10

Resetting the unit 2-11

Chapter Three • Connection and Configuration 3-1

Connecting the Hardware 3-2

Ethernet connection 3-2

Serial connection 3-3

IR connection (SFI244 only) 3-3

Flex I/O connection 3-4

Configuring the Hardware 3-5

PC configuration 3-5

Initial start up 3-5

IPL T SF interface configuration 3-5

Configuring the IPL T SF using the ARP command 3-5

Configuring the IPL T SF using direct PC connection 3-7

Firmware upgrades 3-8

Chapter Four • Communication and Control 4-1

Ports Overview 4-2

Flex I/O ports 4-2

Digital input 4-2

Digital output 4-4

Analog input 4-5

Table of Contents, cont'd

Bidirectional serial control interface ports 4-5

Communication with the Interface 4-6

Web server 4-6

Accessing and using the Web server 4-6

Logon and system status 4-6

Establishing or changing system or port settings 4-7

Controlling IR devices or sending IR commands (SFI244 only) 4-9

Setting and changing your passwords 4-10

Editing and adding e-mail alerts 4-11

Sending an e-mail alert through Telnet 4-12

Upgrading the firmware 4-12

Managing files 4-13

IR Learning (SFI244 only) 4-14

Creating a driver with the IR Learner software 4-15

Programmer's Guide for the Telnet and Web Browser 4-16

Using the command/response table 4-16

Copyright information 4-20

Password information 4-21

Error responses 4-21

References to errors (at command descriptions on the following pages): 4-21

Customization 4-32

Server Side Includes 4-32

Query string 4-33

Code examples 4-34

Example 1 4-34

Example 2 4-36

Example 3 4-37

Example 4 4-37

Example 5 4-39

Example 6 4-40

URL encoding 4-41

Reserved characters 4-42

Unsafe characters 4-42

A/V Device Control 4-43

Custom Web pages 4-43

Telnet (Port 23) 4-43

Accessing and using Telnet 4-43

Direct port access (ports 2001 through 2002) 4-44

Using direct access 4-44

Port redirect 4-45

Troubleshooting 4-45
Power connections 4-46
Data connections 4-46

Appendix A

Specifications, Part Numbers, and Accessories A-1

Specifications A-2
Part Numbers and Accessories A-5
Included parts A-5
Accessories A-5

Appendix B • Glossary B-1

Glossary B-2

All trademarks mentioned in this manual are the properties of their respective owners.

68-738-06 Rev **B**
12 08

Chapter One

Introduction

About this Manual

About the IPL T SF Interfaces

Features

Introduction

About this Manual

This manual contains information about the Extron IPL T SF24 (Extron part #60-544-02) and the IPL T SFI244 (Extron part #60-544-06) Ethernet control interfaces. It includes information on how to install, configure, and operate each system. When information in this manual applies to both models, they may be referred to generally as an IPL T SF unit or interface.

About the IPL T SF Interfaces

The Extron IPL T SF interfaces (SF24 and SFI244) are Ethernet-based control interfaces designed to be used as one of many nodes in a distributed control system environment, or as stand-alone control interfaces allowing legacy products to link to today's IP Link® -based networks.

The IPL T SF24 has two serial ports and four flex I/O ports. Each serial port is available on both 9-pin D and captive screw connectors. The 9-pin D connectors support RS-232, RS-422, and RS-485. The captive screw connectors support RS-232 only. The four flex I/O ports are on a 5-pole captive screw connector which provides one pole for each port, as well as a fifth for ground. All serial ports are fully software configurable through the network using either the Web-based interface or a Telnet connection.

The IPL T SFI244 has one 10-pole, 3.5 captive-screw connector for the two bidirectional COM ports and the four digital I/O ports. It also has one 8-pole, 3.5 captive-screw connector for the four IR output ports. The ports are fully software configurable via the 10/100 Ethernet port using a Web-based interface. The IPL T SFI244 only supports the RS-232 protocol (RS-422 and RS-485 protocols are not supported). The IR ports are capable of transmitting both carrier and non-carrier (wired or IR) control data.

NOTE *The 5-pole captive screw serial ports support only RS-232.*

The IPL T SF interfaces can host their own Web pages, stored in flash memory within the devices. They will support Telnet, SMTP (simple mail transfer protocol), ICMP (Internet control message protocol) or ping, and DHCP (dynamic host configuration protocol).

The IPL T SF interfaces are 1U high and one quarter rack wide. They are rack-mountable, using either a VersaTools® Rack Shelf Kit (Extron part #60-190-20) or a Universal 1U Rack Shelf (Extron part #60-190-01). They can also be mounted under a desk or podium, or on a projector mount.

The IPL T SF interfaces ship with an external, desktop, 12 VDC, 1A power supply (Extron part #28-071-01), that accepts 100-240 VAC input.

Features

Distributed system architecture — A decentralized architecture ensures fault-tolerance throughout the system and stand-alone reliability.

IR remote control — Infrared remote control allows "learning" of commands to control A/V devices.

Easy component configuration — Using the GlobalViewer® software allows point-and-click component configuration and control.

High speed — Provides constant high speed data throughput, with a 6 Mbit/second transfer rate.

User customizable — Tailor the on-board Web pages with advanced programmability, e-mail alerts, and storage to suit your needs and requirements. You may also develop your own Web pages using the GlobalViewer application software.

Direct port access — Use existing software programs to control a device that has no Ethernet support. Any existing Extron product with a serial control port can be interfaced with a LAN.

Built-in multilevel security — User controls access to the devices attached to the interface. Two levels of password protection provide appropriate security.

Easily connected — Serial ports on 3.5 mm, captive screw connectors, and RJ-45 male auto-sense 10/100 Mbs Ethernet LAN connection.

I/O ports — Can be used to sense when a switch or relay has been activated (input). Can also be used to activate external relays for power, screens, or projector lift controls (output).

IR ports (SFI244 only) — Allow control of up to 16 devices, with four IR emitters per port.

Easily configured and controlled —

Using a standard Web browser (Microsoft® Internet Explorer® V5.5, Netscape® Navigator ® V6.0 or higher) and Web-based interface.

Using a standard Telnet client application.

Requires no centralized processor to operate within a system.

Choice of mounting options — Can be mounted under a desktop or podium, on a projector mount, or on a rack shelf.

Remote management — Allows you to remotely manage projectors, cameras, video conferencing equipment, switchers, and other A/V equipment.

Multiple protocols supported — Allows use of Telnet, SMTP, ICMP, ARP, and DHCP protocols.

Chapter Two

Installation and Operation

Installation Overview

Mounting the IPL T SF Interface

Rear Panel Features and Cabling

Operation

Installation Overview

To install and set up the IPL T SF24 and SFI244 interfaces:

1. Turn all of the equipment off. Make sure that the video sources (DSS, cable boxes, or other devices), the IPL T SF unit, the output devices (monitors, VCRs, projectors, etc.) and the serial controller are all turned off and disconnected from the power source.
2. Mount the IPL T SF unit. See "Mounting the IPL T SF Interface" below.
3. Attach the cables. See "Connecting the Hardware" in chapter 3.
4. Connect power cords and turn on the devices in the following order: output devices (projectors, monitors, speakers), the IPL T SF unit, a serial controller or PC, then all input devices (DSS, cable boxes, etc.).
5. Configure the IPL T SF interface through Telnet, then access the IPL T SF interface using an Internet browser.

Mounting the IPL T SF Interface

UL guidelines for rack mounting

The following Underwriters Laboratories (UL) guidelines pertain to the installation of an IPL T SF Series unit onto a rack.

1. **Elevated operating ambient** — If installed in a closed or multi-unit rack assembly, the operating ambient temperature of the rack environment may be greater than room ambient. Therefore, consider installing the equipment in an environment compatible with the maximum ambient temperature specified by the manufacturer [Tma = +32 to +122 °F (0 to +50 °C)].
2. **Reduced air flow** — Installation of the equipment in a rack should be such that the amount of air flow required for safe operation of the equipment is not compromised.
3. **Mechanical loading** — Mounting of the equipment in the rack should be such that a hazardous condition is not achieved due to uneven mechanical loading.
4. **Circuit overloading** — Consideration should be given to the connection of the equipment to the supply circuit and the effect that overloading of the circuits might have on overcurrent protection and supply wiring. Appropriate consideration of equipment nameplate ratings should be used when addressing this concern.

5. **Reliable earthing (grounding)** — Reliable earthing of rack-mounted equipment should be maintained. Particular attention should be given to supply connections other than direct connections to the branch circuit (such as the use of power strips).

Rack mounting

For optional rack mounting, mount the interface on a VersaTools™ 19" 1U Rack Shelf (Extron part #60-190-20) (figure 2-1) or a standard Universal 1U Rack Shelf (Extron part #60-190-01) (figure 2-2). On the standard rack shelf, the interface mounts in one of four locations to the rear of the rack or in one of four locations to the front of the rack.

1. If feet were previously installed on the bottom of the IPL T SF unit, remove them.
2. Mount the interface on the rack shelf, using two 4-40 x 3/16" screws in opposite (diagonal) corners to secure the interface to the shelf.
3. Install blank panel(s) or other unit(s) to the rack shelf.
4. Insert the shelf into the rack, aligning the holes in the shelf with those in the rack.
5. Secure the shelf to the rack using the supplied machine screws. This shelf can be mounted in the front or in the rear of the rack.

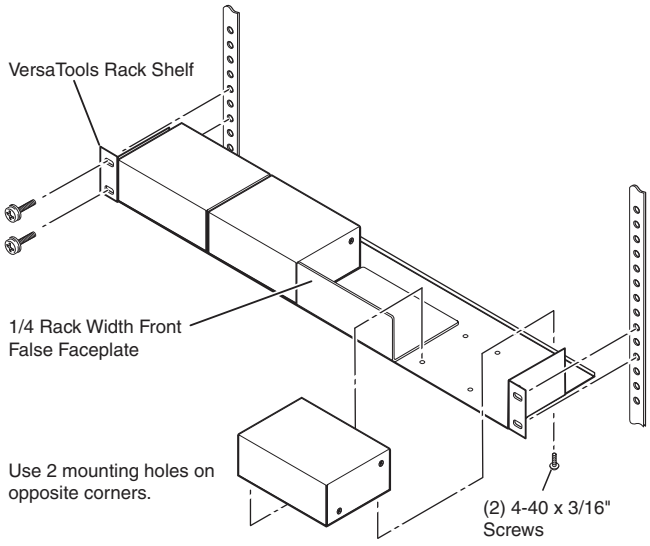


Figure 2-1 — Rack mounting the interface on the VersaTools shelf (SFI244 model shown)

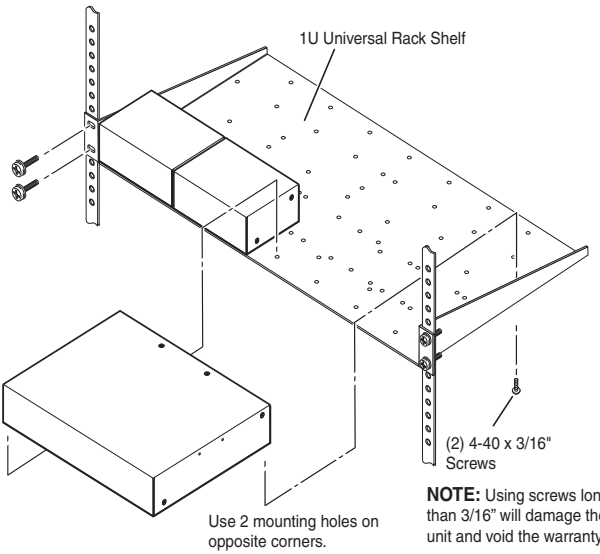

1U Universal Rack Shelf
(2) 4-40 x 3/16" Screws
NOTE: Using screws longer than 3/16" will damage the unit and void the warranty.
Use 2 mounting holes on opposite corners.

Figure 2-2 — Mounting the interface on the standard shelf

Furniture or projector mounting

In addition to using the IPL T SF unit on a rack, it can also be furniture or projector mounted. Furniture mount or projector mount the interface using the optional mounting kit (Extron part #70-212-01, furniture, or Extron part #70-217-01, projector) as follows:

1. Attach the mounting brackets to the interface with the machine screws provided (figure 2-3).
2. If feet were previously installed on the bottom of the interface, remove them.
3. **For furniture mounting**, hold the interface with the attached brackets against the underside of the table or other furniture. Mark the location of the screw holes of the bracket on the mounting surface.
4. **For furniture mounting**, drill 3/32" (2 mm) diameter pilot holes, 1/4" (6.3 mm) deep in the mounting surface at the marked screw locations.
5. **For furniture mounting**, insert #8 wood screws into the four pilot holes. Tighten each screw into the mounting surface until just less than 1/4" of the screw head protrudes.

6. **For furniture mounting**, align the mounting screws with the slots in the brackets and place the interface against the surface, with the screws through the bracket slots.
7. **For furniture mounting**, slide the unit slightly forward or back, then tighten all four screws to secure it in place.
8. **For projector mounting**, secure the interface to a projector mount or other surface by inserting the mounting bolt through the bracket's slotted hole.

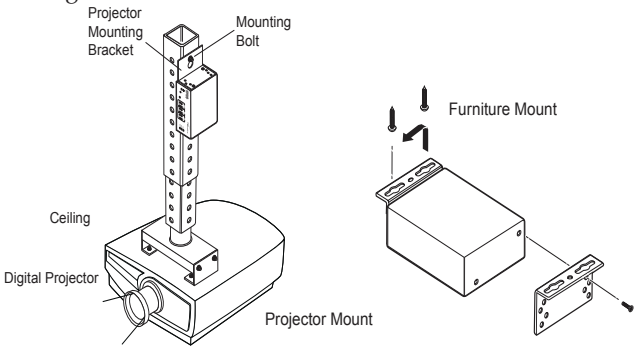


Figure 2-3 — Mounting the IPL T SFI244

Rear Panel Features and Cabling

All connections, including power, input and output, and control, are on the rear panel of the IPL T SF24 and IPL T SFI244. See figures 2-4 and 2-5.

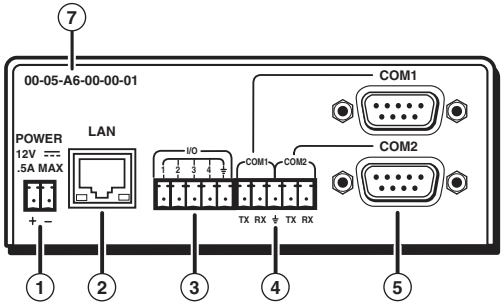


Figure 2-4 — IPL T SF24 rear panel

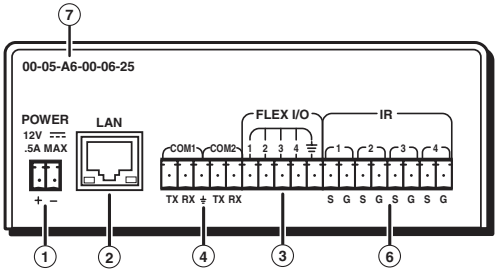


Figure 2-5 — IPL T SFI244 Interface rear panel

Power

① **Power connection —** Plug the external 12V power supply into this connector. The power supply is included with the unit.

WARNING *When connecting the power supply, voltage polarity is extremely important. Applying power with incorrect voltage polarity could damage the power supply and the interface. Identify the power cord negative lead by the ridges on the side of the cord.*

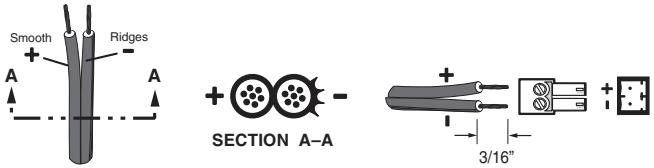


Figure 2-6 — Power connector wiring

NOTE *Do not tin the stripped power supply leads before installing the captive screw connector. Tinned wires are not as secure in the captive screw connectors and could pull out.*

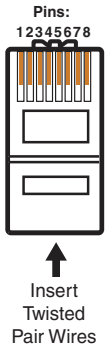
WARNING *The two power cord wires must be kept separate while the power supply is plugged in. Remove power before continuing.*

To verify the polarity before connection, plug in the power supply with no load and check the output with a voltmeter.

Ethernet/LAN

② **LAN Activity LED —** A blinking yellow LED indicates LAN activity.

LAN connector — Plug an RJ-45 jack into this socket to connect the unit to a computer network. Use a straight-through cable to connect to a switch, hub, or router, and a crossover cable to connect directly to a PC.



Straight-through Cable
(for connection to a switch, hub, or router)

End 1		End 2	
Pin	Wire Color	Pin	Wire Color
1	white-orange	1	white-orange
2	orange	2	orange
3	white-green	3	white-green
4	blue	4	blue
5	white-blue	5	white-blue
6	green	6	green
7	white-brown	7	white-brown
8	brown	8	brown

Crossover Cable
(for direct connection to a PC)

End 1		End 2	
Pin	Wire Color	Pin	Wire Color
1	white-orange	1	white-green
2	orange	2	green
3	white-green	3	white-orange
4	blue	4	blue
5	white-blue	5	white-blue
6	green	6	orange
7	white-brown	7	white-brown
8	brown	8	brown

Figure 2-7 — RJ-45 connector wiring

Link LED — The green LED lights to indicate a good LAN connection.

Serial communication

③ **Flex I/O ports —** Four I/O ports permit connection of switches and sensors to provide input to the system, and contact closure activation of relays for power, screen, or projector lift control (output). Plug a serial cable into this 3.5 mm, 5-pole captive screw connector for flexible I/O connection.

④ **COM ports —** Plug a 3.5 mm, 5-pole captive screw connector into this socket for serial ports 1 and 2.

⑤ **COM1 and COM2—** Plug a serial cable into this 9-pin D connector for serial port 1 or serial port 2 connection. See figure 2-8 for pin assignments.

NOTE *Take note that the IPL T SF24 allows for use of either the 9-pin D connector **or** the captive screw connector on COM1 or COM2. The COM 9-pin D and the COM captive screws cannot be loaded simultaneously.*

Pin	Function	RS-232	RS-422	RS-485
2	Receive Data/Receive Data -	RX	RX-	Data -
3	Transmit Data/Transmit Data -	TX	TX-	Tie 2 & 3
5	Signal Ground	GND	GND	GND
7	Request to Send/Transmit Data +	RTS	TX+	Data +
8	Clear to Send/Receive Data +	CTS	RX+	Tie 7 & 8

Figure 2-8 — COM1 and COM2, 9-pin D connector pin assignments (SF24 only)

⑥ **IR/Serial out ports —** Plug a serial cable into this 3.5 mm, 5-pole captive screw connector for infrared or serial connections.

The IPL T SF24 and SFI244 interfaces can be used to control display devices, switchers, and other A/V equipment via an RS-232 connection.

Factory default protocol for the control interface is:

- RS-232
- 9600 baud
- no parity
- 8 data bits
- 1 stop bit
- pacing = 0 ms
- handshaking = off

The control device (PC, laptop, etc.) can use either Extron's Simple Instruction Set (SIS™) or the graphical control program for Windows®, via a Web browser.

Pin assignments for the rear panel, 9-pin D connector COM ports on the IPL T SF24 are shown in figure 2-8.

Identification

⑦ **UID # —** The unique User ID number (MAC address) of the unit (for example, 00-05-A6-00-00-01).

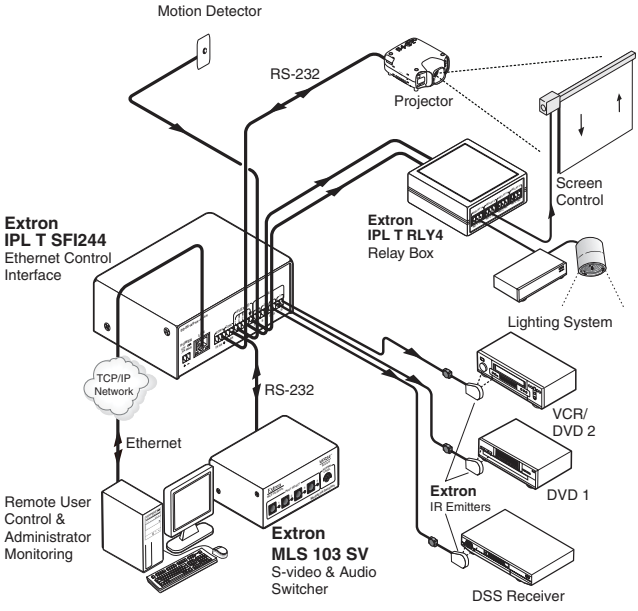


Figure 2-9 — Example application using I/O ports

Operation

Connect power cords and turn on the display output devices (projectors, monitors, VCRs), control devices (switchers, scalers, distribution amplifiers), interface, and input devices (PC, laptop, network equipment).

Check indicator LEDs on the PC/laptop, on the interface, and on the network hub/router, etc., to ensure that all devices are plugged in and communicating. The IPL T SF interface is now ready to be configured (see chapter 3, "Connection and Configuration").

If connection or communication problems occur, see *Troubleshooting* in chapter 4. If the troubleshooting tips do not help, check with your local network administrator, or call the Extron S^3 Sales & Technical Support Hotline.

Front panel indicators

The front panel of the IPL T SF24 and SFI244 interfaces has several indicator LEDs that show the current status of communications to and from the unit. A Reset button (②) is also available from the front panel, in a small recess next to the Power LED.

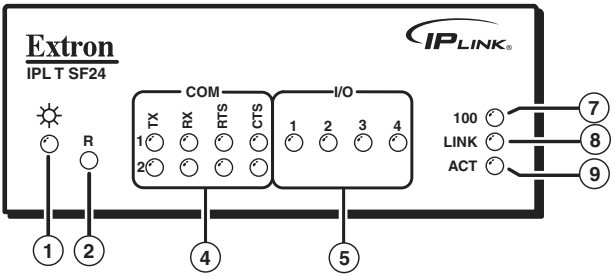


Figure 2-10 — IPL T SF24 front panel

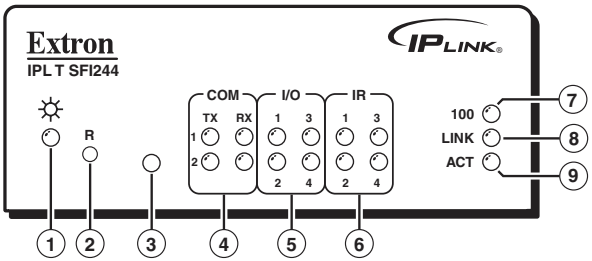


Figure 2-11 — IPL T SFI244 front panel

① **On/Off indicator LED** — A green LED lights to indicate that the interface is receiving power.

② **Reset button (recessed)** — See "Resetting the unit" below in this chapter for details on this multi-function Reset button.

③ **IR learning receiver —** This smaller infrared receiver "learns" commands from other devices' IR remote controls. See the IR Learner software's help file for IR learning procedures.

④ **COM ports —** A green LED indicates that data is being transmitted or received (TX or RX); ready to send or ready to accept data (RTS or CTS for IPL T SF24) from the corresponding serial port (1 and 2).

⑤ **I/O ports —** A green LED indicates that the corresponding I/O port (1-4) is active.

⑥ **IR/Serial ports —** A green LED lights to indicate that the corresponding serial port (1-4) is transmitting data.

⑦ **100 LED —** A green LED lights to indicate that the connection speed is 100 Mbs. If the LED is not lit, the connection speed is 10 Mbs.

⑧ **Link LED —** A green LED indicates that the unit is connected to an active network.

⑨ **Act (Activity) LED —** A yellow LED lights to indicate that data is being sent/received.

Resetting the unit

There are five reset modes available by using the Reset button (②) on the front panel. The Reset button is recessed, so use of a pointed stylus, ballpoint pen, or Extron Tweeker is suggested.

CAUTION *Review the reset modes carefully. Use of the wrong reset mode may result in unintended loss of flash memory programming, the reassignment of ports, or a unit reboot.*

CAUTION *The reset modes listed on the next page (with the exception of Mode 2) closes all open IP and Telnet connections and closes all sockets.*

NOTE *If the Reset button is continuously held down, every 3 seconds the LED pulses (blinks) and puts the unit in a different mode, corresponding to the underscored notes in Modes 3 through 5, below. The Mode 5 LED blinks three times, the third blink indicating that it's the last mode. The following modes are listed as separate functions, not as a continuation from Mode 1 to Mode 5.*

Reset Mode Comparison/Summary

Mode	Activation	Result	Purpose/Notes
1	Hold down the recessed Reset button while applying power to the IPL T SF unit. NOTE *After a mode 1 reset is performed, update the unit's firmware to the latest version.* ***Do not*** *operate the unit's firmware version that results from the mode 1 reset. If you want to use the factory default firmware, you must upload that version again.*	**The unit reverts to the factory default firmware.** Event scripting will not start if the unit is powered on in this mode. All user files and settings (drivers, adjustments, IP settings, etc.) are maintained. NOTE *If you do not want to update firmware, or you performed a mode 1 reset by mistake, cycle power to the unit to return to the firmware version that was running prior to the mode 1 reset. Use the 0Q SIS command to confirm that the factory default firmware is no longer running (look for asterisks following the version number.)*	Use mode 1 to revert to the factory default firmware version if incompatibility issues arise with user-loaded firmware.
2	Press and release the Reset button. Within 2 seconds type +++ on the keyboard. NOTE *If the three "+'s" (+++) are not enetered in the 2-second time frame, the COM port becomes a control port only.*	**The connected COM port becomes a console port to send SIS commands.** Scripting remains on.	Mode 2 enables the SIS console port
3	Hold down the Reset button for about 3 sec. until the Reset LED blinks once, then press Reset momentarily (<1 sec.) within 1 second.	**Mode 3 turns events on or off.** During resetting, the Reset LED flashes 2 times if events are starting, 3 times if events are stopping.	Mode 3 is useful for troubleshooting.
4	Hold down the Reset button for about 6 sec. until the Reset LED has blinked twice (once at 3 sec., again at 6 sec.). Then press Reset momentarily (for <1 sec.) within 1 second.	**Mode 4** • Enables ARP capability. • Sets the IP address back to factory default (192.168.254.254). • Sets the subnet back to factory default. • Sets the default gateway address back to the factory default. • Sets port mapping back to factory default. • Turns DHCP off. • Turns events off. Reset LED flashes 4 times in quick succession during reset.	Mode 4 enables you to set IP address information using ARP and the MAC address.
5	Hold down the Reset button for about 9 sec. until the Reset LED has blinked three times (once at 3 sec., again at 6 sec., again at 9 sec.). Then press Reset momentarily (for <1 sec.) within 1 second.	**Mode 5 performs a complete reset to factory defaults (except the firmware).** • Does everything mode 4 does. • Resets almost all the real time adjustments: all audio settings, limit initial power up volume, power up/down delay, auto power down, and misc. options. This does not affect an optional MLS switcher, however. • Clears driver-port associations and port configurations (IR/RS-232). • Removes button configurations. • Resets all IP options. • Removes scheduling settings. • Removes/clears all files from switcher. The Reset LED flashes 4 times in quick succession during the reset.	Mode 5 is useful if you want to start over with configuration and uploading, and also to replace events.

3

Chapter Three

Connection and Configuration

Connecting the Hardware

Configuring the Hardware

Connecting the Hardware

To connect the IPL T SF interface, hook up the input and output devices to the unit using figure 3-1 as a guide. Before connecting the IPL T SF unit to a local area network (LAN) you must initially connect a PC directly to the IPL T SF unit and change the default IP address to an address specified by your network administrator (for a LAN connection).

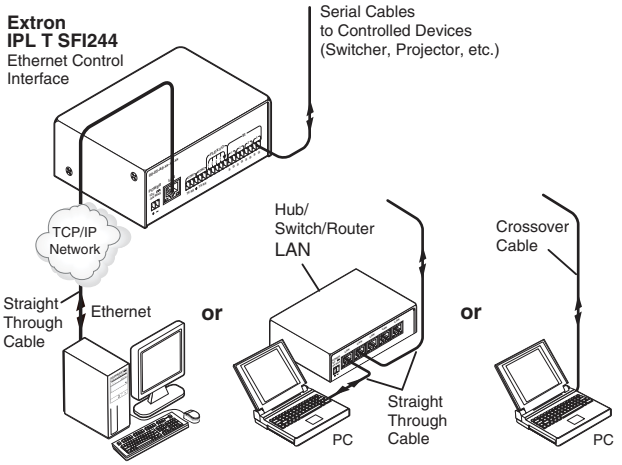


Figure 3-1 — IPL T SF interface connections

Ethernet connection

This type of connection is used on an ongoing basis to connect the IPL T SF unit and to control switching and display devices through the unit.

1. Plug one end of a CAT 5, straight-through Ethernet cable into the rear panel Ethernet connector on the IPL T SF unit. Refer to figure 2-7 for RJ-45 connector wiring.
2. Plug the other end of the Ethernet cable into a network switch, hub, or router connected to an Ethernet LAN or to the Internet.
3. Launch your Web browser on your PC and type the Web address that you set up on the IPL T SF unit (see "IPL T SF interface configuration" later in this chapter) in the browser's Address field. The initial IPL T SF default Web page is displayed.

Serial connection

The IPL T SF interface can be connected to any existing A/V product that has a serial control port.

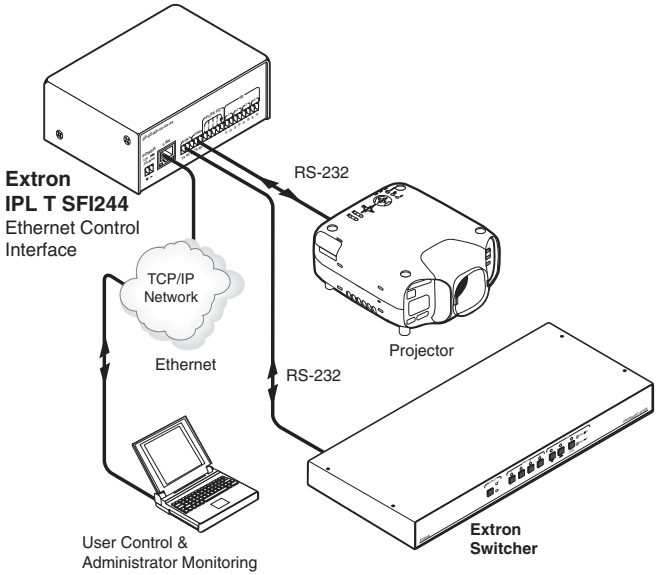


Figure 3-2 — Typical IPL T SFI244 Serial connection

1. Connect one end of a serial cable to the rear panel COM port connector of the interface unit. As an alternative, you can use a 3.5 mm, 5-pole captive screw connector wired appropriately, where available. See figure 2-8 for pin assignments.
2. Connect the other end of the serial cable to the display or switching device to be controlled through the interface.

IR connection (SFI244 only)

Wiring for the IR emitter is provided by the IR ports. The IPL T SF interface provides enough current to power up to four IR emitters with a 100 foot run each, or at least 1 at up to 4000 feet. IR control can be applied to devices such as VCRs, audio tape players, or DVD players.

1. Connect one end of an IR emitter cable to the rear panel IR port connector of the interface unit. See figure 3-3 for connection options.
2. Place the head of each IR emitter over or directly adjacent to the controlled device's IR receiver.

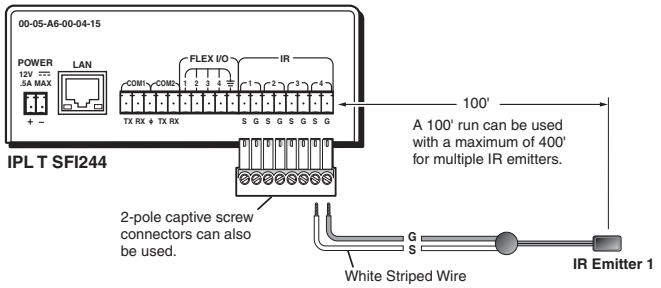


Figure 3-3 — IR connection with 8-pole captive screw and IR emitter

IR learning frequencies are 30 kHz to 1 Mhz. For more information on IR learning, see "IR Learning(SFI244 only)" in chapter 4.

Flex I/O connection

The IPL T SF interfaces provide flexible I/O ports that can be configured to three different operational modes: digital input, digital output and analog input. These ports can interface with devices such as relays, LEDs, and switches, and can also be configured to receive analog voltages for use with photo sensors and level feedback.

1. Connect one end of a serial cable to the rear panel flex I/O port connectors of the interface unit.
2. Connect the other end of the serial cable to the display or switching devices to be controlled through the interface.

For information on configuring the flex I/O ports, see "Establishing or changing system port settings" in chapter 4.

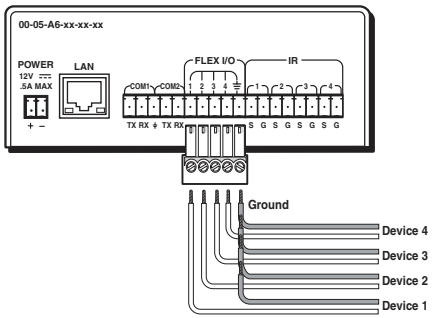


Figure 3-4 — Flex I/O connection with 5-pole captive screw on an SFI244

Configuring the Hardware

To function together properly, both the controlling PC and the IPL T SF interfaces must be configured correctly: the PC must be network-capable, with the proper protocols installed and the hardware configured correctly, and the interface must be set to recognize and accept commands and pass them through to the switcher, projector, or other controlled device.

PC configuration

This manual assumes that you have a Windows® PC equipped with an operating network adapter. To allow your PC to work with Extron's Ethernet-controlled products, the TCP/IP protocol must be installed and properly configured.

For use on an existing Ethernet LAN intranet, your network administrator can provide you with a unique IP address or confirm whether you need to set up the IPL T SF unit for DHCP (Dynamic Host Configuration Protocol) to have an address assigned automatically when you sign on.

Initial start up

When you power on the IPL T SF interface for the first time, there are two ways to set up the IP address:

1. Use the ARP command method.
2. Use the direct PC method.

The default Web pages that are pre-loaded on the IPL T SF interface provide a way to reconfigure the IPL T SF unit once it has an active network connection with IP access. These Web pages are compatible with Netscape® Navigator® (version 6.0 or higher), or Internet Explorer® (version 5.5 or higher). See "Communication with the Interface" in chapter 4 for information on accessing and configuring the interface.

Once the interface has been reconfigured, an Ethernet (intranet or Internet) connection can subsequently be used to contact or control it. Refer to "Ethernet connection" in this chapter for additional information.

IPL T SF interface configuration

Configuring the IPL T SF using the ARP command

You can make use of the ARP (Address Resolution Protocol) command to set up an IP address for your IPL T SF interface. The ARP command tells your computer to associate the IPL T SF unit's MAC address with the assigned IP address. You must then use ping to access the IPL T SF unit, at which point the device server's IP address will be reconfigured.

NOTE *In order to use this setup method, both your computer and IPL T SF interface must be connected to the same LAN. Or, you may use a crossover Ethernet cable to connect the device server directly to your computer's Ethernet card.*

Use ARP to configure the IP address as follows:

1. Obtain a valid IP address for your IPL T SF interface from your network administrator.
2. Obtain the IPL T SF unit's MAC address (UID #) from the label on its rear panel.
3. If the unit has never been configured and is still set for factory defaults, go to step 4. If not, perform a Mode 4 system reset. For detailed information on reset modes, see "Resetting the unit" in Chapter 2.

CAUTION *Your IPL T SF unit must be configured with the factory default IP address — 192.168.254.254 — before executing the ARP command, as described below.*

4. Access the MS-DOS command prompt, then execute the 'arp –s' command.

   Enter the desired new IP address and the MAC address (the MAC address is located on the rear panel's upper right corner) for the IPL T SF unit. For example:

   arp –s 10.13.170.15 00-05-A6-00-0A-90

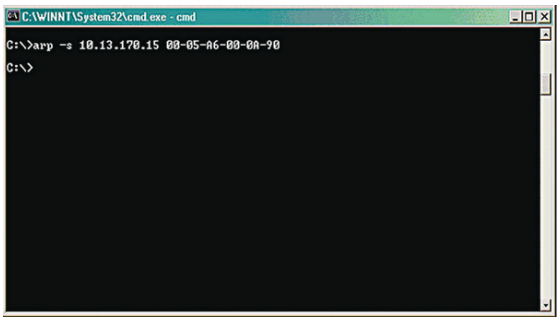


Figure 3-5 — Executing the ARP command

5. Execute a "ping" command by typing your new IP address at the command prompt. For example:

   ping 10.13.170.15

   After issuing this command, the unit changes to the new address and start responding to the ping requests, as shown below. The IPL T SF unit's IP address should

now be updated to the new address, and then you can reconnect using either Telnet or the Web to verify that the update was successful.

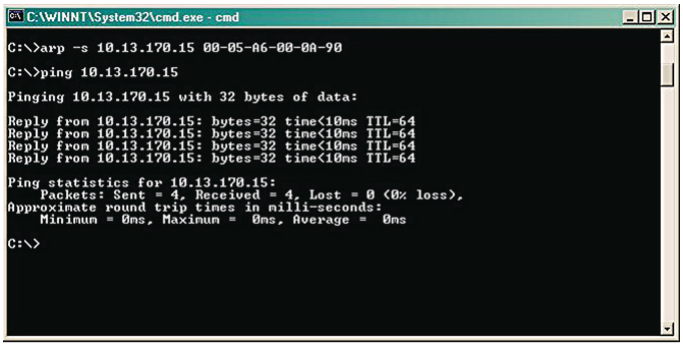


Figure 3-6 — Unit response to a ping request

6. After verifying that the change was successful, issue the arp –d command at the DOS prompt. For example:

   arp –d 10.13.170.15 removes 10.13.170.15 from the arp table

   or

   arp –d* will remove all static IP addresses from the arp table.

Configuring the IPL T SF using direct PC connection

This type of connection is used initially to connect to and configure the IPL T SF unit. The unit's default settings (IP address, subnet mask, and [optional] administrator name and password) must be changed in order to use the unit on an intranet (LAN) or on the Internet (WAN).

1. Plug one end of a CAT 5, crossover Ethernet cable into the rear panel Ethernet connector on the IPL T SF unit. See figure 2-7 for RJ-45 connector wiring.
2. Plug the other end of the Ethernet cable into the Ethernet port on your PC.
3. Right-click on the Network Neighborhood or My Network Places icon on your Windows (98, 2000, NT, ME, XP) desktop and select Properties from the menu.

4. Select Internet Protocol (TCP/IP) from the list and click on Properties. (If you are using Windows 2000, right-click Local Area Connection and select Properties from the menu, then select Internet Protocol (TCP/IP) from the list and click on Properties again.). If Internet Protocol (TCP/IP) is not on the list, it must be added (installed). Refer to your Windows user's manual or the online Help system for information on how to install the TCP/IP protocol.

5. Write down your current IP address and subnet mask below. If your PC is set to "Obtain an IP address automatically," make a note of that, instead.

   IP Address:

   . . .

   Subnet Mask:

   . . .

6. Click on "Specify an IP address" or "Use the following IP address" (depending on your operating system), and leave the default gateway blank. Enter the following values:

   IP address: **192.168.254.253**

   Subnet mask: **255.255.0.0**

7. Save the changes and exit the Network setup. Reboot the PC, if required, for the changes to become effective.

8. Launch your Web browser (Netscape Navigator or Internet Explorer), and type "http://192.168.254.254/index.html" in the Address field. The IPL T SF default Web page is displayed. Refer to "IPL T SF interface configuration", in this chapter, for information on configuring your unit.

9. After configuring your IPL T SF interface, repeat steps **3** and **4** and change your TCP/IP settings back to their original configuration.

Firmware upgrades

Firmware upgrades become available as improvements are made to the versatility and functionality of the IPL T SF interface. These upgrades are available for download from the Extron Web site. For information on upgrading the firmware, see "Upgrading the firmware" in chapter 4.

4

Chapter Four

Communication and Control

Ports Overview

Communication with the Interface

Programmer's Guide for the Telnet and Web Browser

Customization

A/V Device Control

Troubleshooting

Ports Overview

Flex I/O ports

Extron flex I/O ports are configurable input or output ports designed to provide connectivity to various devices such as motion detectors, alarms, lights, LEDs, buttons, photo (light) sensors, temperature sensors, relays, etc. All flex I/O ports are tied to a common ground, but can be individually configured to operate in one of three different modes:

- Digital Input
- Digital Output
- Analog Input

These ports can be configured by using the default Web pages of the IPL T SF Web Server (see figure 4-1 below; also see "Establishing or changing system or port settings" later in this chapter) or by dynamically using the Simple Instruction Set™ commands (see the "Programmer's Guide for the Telnet and Web Browser" in this chapter) via Telnet, scripts or Web pages.

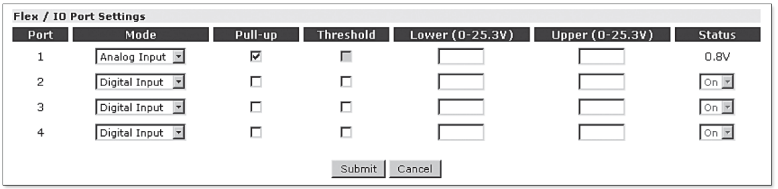


Figure 4-1 — Default Web page for flex I/O

Digital input

When a flex I/O port is configured as a digital input, the port is set to measure two states: 1 or 0; On or Off; high or low. A closed circuit = a logic 1 and an open circuit = a logic 0.

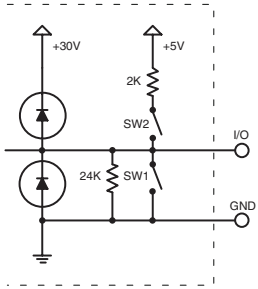


Figure 4-2 — equivalent digital input circuit

The Digital Input mode has two configurable options:

1. The ability to turn on an internal pull-up resistor to +5 VDC (shown below as SW2)
2. Adjustable detection threshold voltages

The default threshold voltages follow standard TTL logic: a voltage below 0.8 VDC is measured as logic low, and a voltage above 2.0 VDC is measured as logic high. Using an adjustable threshold, the integrator can select the proper high and low voltages for the installation.

NOTE *In the figure below, the SW2 switch is turned closed, activating the +5 VDC and 2K pull-up resistor.*

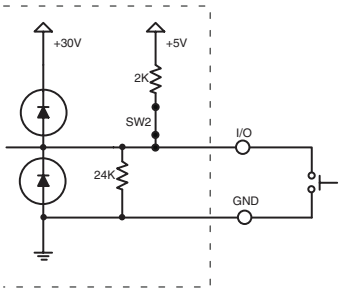


Figure 4-3 — Sample wiring for a digital input reading an external pushbutton switch

If the integrator selects threshold voltages that are more than 0.1 V apart, a deadband, or hysteresis, will be established.

In the example below, the lower threshold voltage is set at +6 VDC and the upper threshold is set at +16 VDC. The colored bands show state changes on the logical outputs.

The range between 6-16 VDC is the deadband in which the signal can fluctuate without affecting the input state.

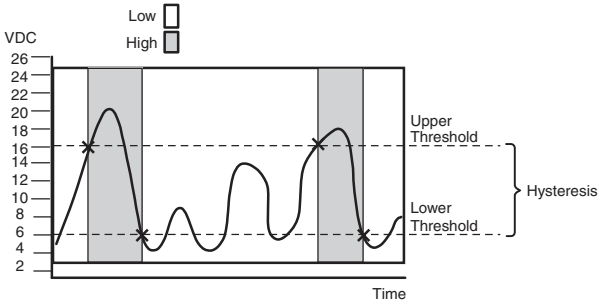


Figure 4-4 — High and low transitions of adjustable threshold with deadband (hysteresis)

Digital output

When a flex I/O port is configured as a digital output, it is set to offer two output states: "on" and "off". When the port is set to an "on" state, (SW1 is closed), the I/O pin is connected to ground (each I/O port is capable of sinking 250 mA max.). When the port is set to the "off" state, (SW1 is open), the output pin is floating.

If the application calls for TTL compatibility, SW2 can be selected to provide a 2K pull-up resistor to +5 VDC.

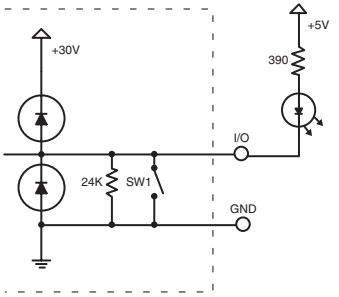


Figure 4-5 — Sample of a digital output port driving an LED using an external +5 VDC source

Analog input

When a flex I/O port is configured as an analog input, the port can measure 0 to 25.3 VDC with 12 bit accuracy. A DC level is indicated by a count from 0-4096 (≈ 6 mv/count).

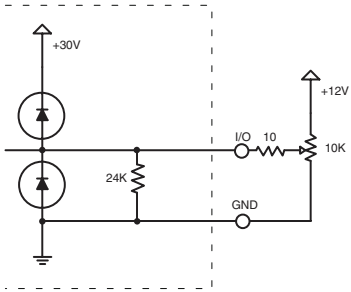


Figure 4-6 — Sample of an analog input for a level adjustment, using a 10K pot

Bidirectional serial control interface ports

The IP Link® family of products has several models that incorporate bidirectional serial control ports. The serial ports allow for control of a wide variety of existing Extron and third-party devices. The most common serial control formats are RS-232, RS-422, and RS-485. Within the IPL T SF products, there are two different implementations for the serial control ports: the 9-pin D connector and the captive screw connector.

9-pin D Connectors — On some IPL T SF units, serial control is accessed through a 9-pin D connector. In this configuration, all three control formats are available and fully software configurable. By selecting the RS-232 format, hardware handshaking (RTS, CTS) is also available. The RS-232 connection uses the same industry standard interface pin-out as found on standard PCs. If selecting either RS-422 or RS-485 formats, verify proper wiring as detailed in figure 2-8. These two formats do not have an industry standard pin-out and will vary from device to device.

Captive Screw Connectors — On other IPL T SF units, several of the serial interface ports are connected on captive screw terminals. When using the ports on the captive screw terminals, only RS-232 control is available, and hardware handshaking is unavailable. Since RS-232 is the most common control interface encountered, this port configuration allows for quick termination.

NOTE *Pacing and handshaking are not supported on captive screw connectors.*

All of the bidirectional serial ports are completely software configurable. Baud rates can be set up to 115 Kbs. Using the Simple Instruction Set (SIS) commands found in the "Programmer's Guide for the Telnet and Web Browser" later in this chapter, these ports can be configured to control most serial devices. Once a port is configured and properly cabled to the controlled device, serial commands can be issued to the port from a Web page, Telnet connection, or by using the advanced scripting capability built into the IP Link product family.

Communication with the Interface

Web server

The on-board Web server is displayed as a set of default Web pages which can be accessed via a Web browser. These pages are the primary means of communication with, and control through, the IPL T SF interface. Web browsers such as Netscape Navigator (version 6.0 or higher), or Internet Explorer (version 5.5 or higher) can be used, but if using Internet Explorer, you must also have Microsoft Script (version 5.6 or higher).

The PC used to access the Web server must have a connection in common with the IPL T SF interface. In other words, both the unit and the PC should be connected to your local intranet or the Internet.

If you have established passwords for the interface, you will be shown a password window when your browser accesses the IPL T SF unit (but not when you initially access the Web server, since no passwords have been established). Your level of control over the interface depends on the password you enter in this password screen. If you enter the *administrator's* password, you have control of all matters of configuration. If you enter a *user* password, you are be restricted to control of A/V devices and viewing status.

Accessing and using the Web server

Logon and system status

1. Double click the Web browser icon on your Windows desktop to launch your Web browser.
2. Enter the IP address of the unit (see "IPL T SF interface configuration" in chapter 3) in the Address field at the top of the screen and press the **Enter** key. The Password window (figure 4-7) is displayed if a password has been set (this will not happen the first time you access the interface, as no password is set at the factory).

Figure 4-7 — Password window

3. The System Status page (figure 4-8) is displayed, showing the current IP and port settings of the unit.

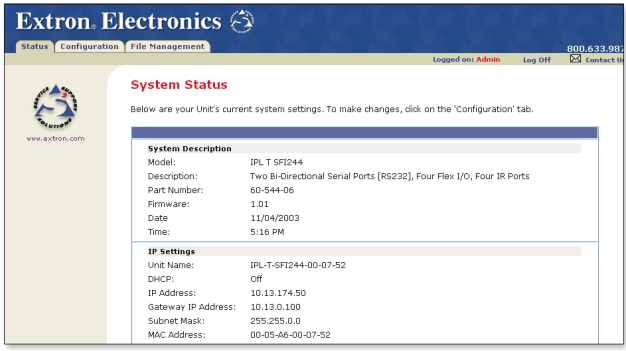


Figure 4-8 — System Status screen

Establishing or changing system or port settings

The System Settings screen is used to initially configure or change configuration of the IPL T SF interface. You may be required to change system settings if your network changes, or if port settings change as you add or change display devices or switchers.

To configure system or port settings:

1. Select the **Configuration** tab and the System Settings screen (figure 4-9) is displayed.

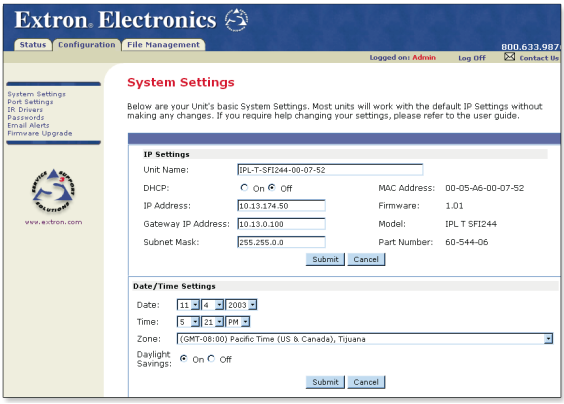


Figure 4-9 — System Settings screen

2. Make changes to the IP settings or date/time settings, as necessary.
3. Click the **Submit** button to enter the changes, or click the **Cancel** button to revert to the previous settings.
4. Click **Port Settings** on the menu (on the left side of the window) and the Port Settings screen (figure 4-10) is displayed.

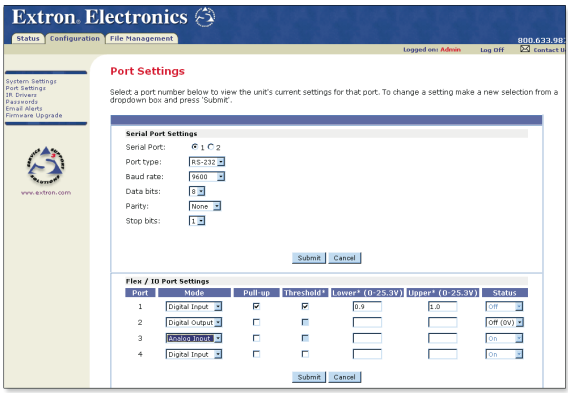


Figure 4-10 — Port Settings screen

5. Select the desired port and make changes to the port settings, as necessary.
6. Click the **Submit** button to enter the changes, or click the **Cancel** button to revert to the previous settings.

Controlling IR devices or sending IR commands (SFI244 only)

In order to send IR commands to IR devices via the default Web pages, do the following:

1. Select the **File Management** tab and the File Management screen (figure 4-16) is displayed.
2. Upload the IR driver to the box by clicking the **Browse** button and locating the appropriate driver. The IR driver file must be named numerically (ranging from 0 to 99).

NOTE *File names must end with an .eir extension. (e.g., 0.eir, 24.eir, etc.)*

3. Select the **Configuration** tab.
4. Click **IR Drivers** on the menu (on the left side of the window) and the IR Drivers screen (figure 4-11) is displayed. All uploaded IR drivers should be displayed on this page.

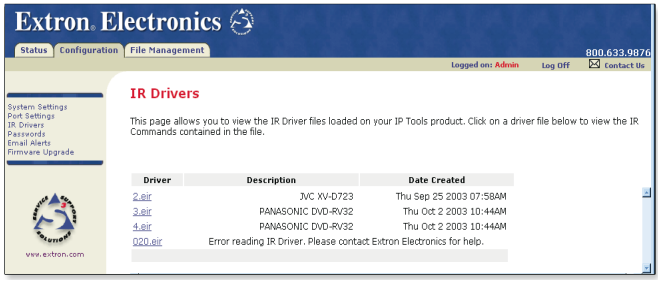


Figure 4-11 — IR Driver screen

5. Click the IR driver that controls the device. A separate IR interface screen (figure 4-12) displays the commands in the driver.
6. Select the port to which the IR command will be sent.
7. Execute the IR command by clicking the command link. The IR LED on the front of the IPL T SFI244 unit will blink a green light verifying the sending of the IR command.

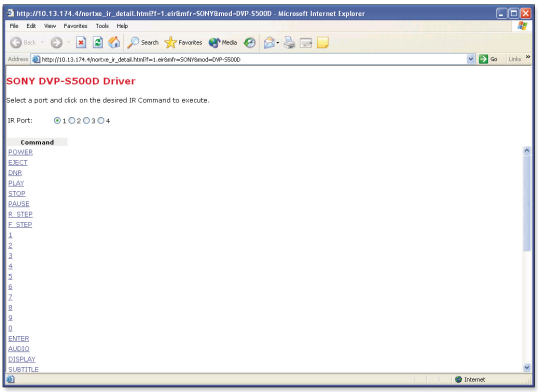


Figure 4-12 — Example of the default Web interface of an .eir file

Setting and changing your passwords

For security reasons you may want to set passwords initially, or change passwords either periodically or on a scheduled basis. If passwords have been set, you must log on as an administrator to change passwords.

To set or change the passwords:

1. Click the **Passwords** link on the menu (on the left side of the window) and the Passwords screen (figure 4-13) is displayed.
2. Enter the passwords for administrator and/or user, then re-enter the same passwords to confirm.
3. Click the **Submit** button to enter the changes, or click **Cancel** to revert to previous settings. If the fields are blank, no passwords have been assigned.

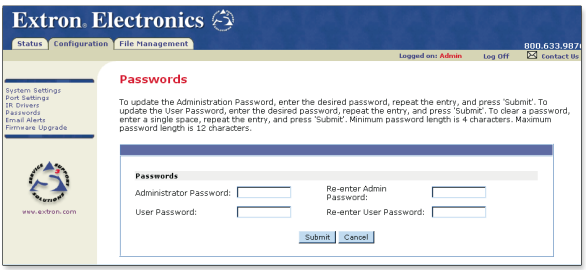


Figure 4-13 — Passwords screen

4. Once passwords have been set, you will be required to enter a password (figure 4-7) whenever you log on to the unit.

NOTE *To clear a password, enter a single space, repeat the entry, and press* **Submit**.

NOTE *If there is no administrator password, your user password will not be saved.*

Editing and adding e-mail alerts

If you have created scheduled events or monitoring tasks on the IPL T SF interface, you can write an e-mail alert with a message corresponding to that event or task (e.g., a timer notification indicating it's time to replace a projector light bulb). The e-mail alert can notify up to eight recipients at one time.

To edit notification e-mail addresses from the Email Alerts page:

1. Click **Email Alerts** on the menu (on the left side of the window) and the Email Alerts screen (figure 4-14) is displayed.

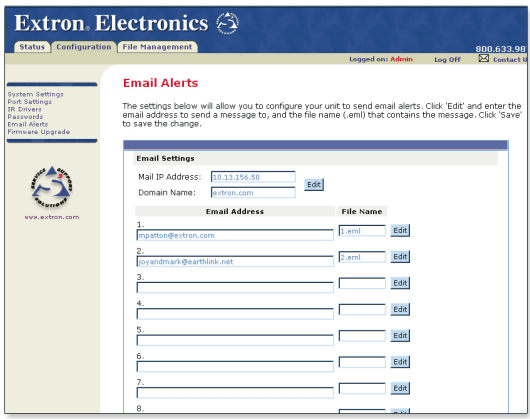


Figure 4-14 — Email Alerts screen

2. Click the **Edit** button to go into edit mode.
3. Add, update, or change the IP address and domain name of your mail server under Email Settings.
4. Click **Save** to keep changes.
5. Click the **Edit** buttons to independently edit each e-mail address and file name.
   a. Enter the e-mail address of the alert recipient in one of the numeric mailboxes under Email Address.
   b. Enter the name of the file containing the alert message under File Name.
   c. Click **Save** to keep changes to recipient e-mail addresses and file names.

CAUTION *File names must end with an .eml extension.*

NOTE *Due to the 7 character limit for full file names, it's advised that you use numeric titles (e.g., 1.eml, 24.eml). Numeric titles reduce the characters of the file name, and assist in keeping the alert files organized. However, alphabetical titles are permitted.*

To finalize your new e-mail alerts within the Web server, do the following:

6. Obtain your gateway IP address from your system administrator.
7. Click **System Settings** on the menu on the left side of the window.
8. Within the System Settings screen (figure 4-9) place the gateway IP address into the Gateway IP Address field.

Sending an e-mail alert through Telnet

To complete the process of sending an e-mail alert, you must send it through a Telnet session and receive confirmation. To do so:

1. Open a Telnet session. For instructions on how to do this, see "Accessing and using Telnet" later in this chapter.
2. Use the "Send e-mail" SIS command to send the alert to the e-mail address of a numeric mailbox (see figure 4-14). Refer to the "Programmer's Guide for the Telnet and Web Browser" later in this chapter for specific command code.

For example, the code for sending an alert from the 4th numeric mailbox would be

Esc 4 SM↵

For detailed information on creating monitoring and scheduling scripts and software, see the *GlobalViewer® Software User's Guide*.

Upgrading the firmware

Firmware upgrades become available as improvements are made to the versatility and functionality of the IPL T SF interface. These upgrades are available for download from the Internet.

CAUTION *The firmware file you select to upload* must *have the extension ".S19". Uploading the incorrect file may cause your unit to stop working.*

To upgrade the firmware:

1. Click **Firmware Upgrade** on the menu (on the left side of the window) and the Firmware Upgrade screen (figure 4-15) is displayed.

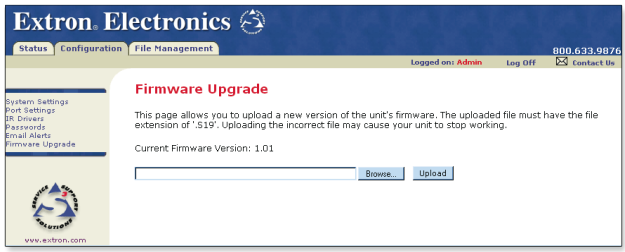


Figure 4-15 — Web server Firmware Upgrade screen

2. Click the **Browse** button to find the most current available version of the firmware.

   If you find a later version than the one shown above the box, click Upload to upgrade to the newer version.

CAUTION *If you leave the page before upload is complete, the upload will be cancelled.*

Managing files

File Management is a useful tool that allows you to use and upload existing and custom Web pages. Custom pages can be developed using a third-party Web page development program such as FrontPage® or Dreamweaver®. File management also allows you to remove unnecessary or outdated files when they are no longer needed.

To add or update files:

1. Select the **File Management** tab and the File Management screen (figure 4-16) is displayed.

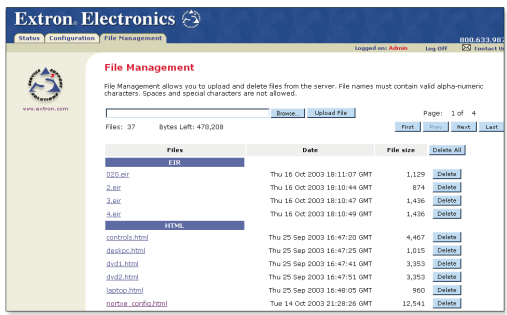


Figure 4-16 — Web server File Management screen

2. Click the **Browse** button to locate the file you want to upload.
3. Click the **Upload File** button to upload the file.

The file is added to the list of files under the Files column. After ten files have been loaded, additional file management pages appear in the page navigation area (on the right side of the screen).

To delete unwanted files:

1. Select the **File Management** tab and the File Management screen (figure 4-16) is displayed.
2. Find the file you wish to delete under the Files list.
3. Click the **Delete** button of the file to be deleted. If you wish to delete additional files, wait for the screen to refresh before clicking the **Delete** button of the next file.

If you wish to delete all files, click the **Delete All** button. The file count will revert to 0 and all subsequent pages are deleted.

IR Learning (SFI244 only)

The IPL T SFI244 IR can "learn" commands from a third-party remote control device in order to control devices such as VCRs, audio tape players, or DVD players. IR learning can be performed in conjunction with the GlobalViewer to assist in controlling commonly used functions.

During IR learning, the user must hold the device remote between 2" and 12" away from the IR pick up device. See figure 4-17 for an example.

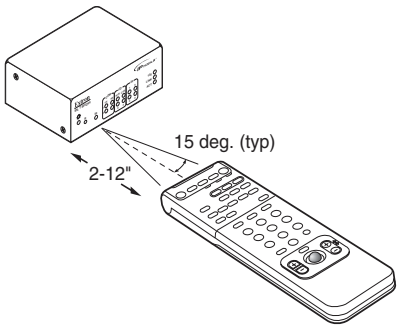


Figure 4-17 — IR remote distance

Creating a driver with the IR Learner software

In order to use your third-party remote device with the IPL T SFI244, the functions of your third–party driver must be "learned" by the IPL T SF unit. In other words, you must create a driver for your remote control device. You have the option of creating a new, custom driver or manipulating an existing driver. Both can be accessed or created through the IR Learner software.

To create a driver for your remote control device:

1. Launch the IR Learner software application. The application window appears; there are no open drivers.
2. Create a new or empty driver by selecting **File > New**. A driver document is created, and its **Header** tab is selected.

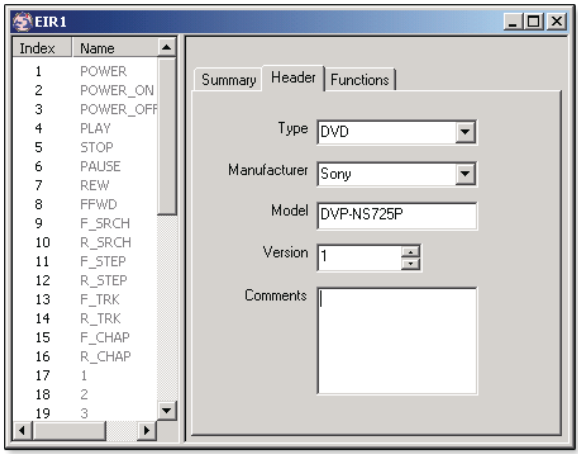


Figure 4-18 — Creating a new driver

3. Edit the Header fields (figure 4-18), the most important of which is Type. The driver is populated with a default set of commands according to the selected device type. A device type of "Other" creates an empty driver with no functions.
4. Add functions by pressing the **Add** button in the toolbar.

NOTE *User-definable functions may be added to the driver. The names and ordering of user-definable functions may be changed at any time by double-clicking on the function to be renamed. The names and ordering of any default functions cannot be altered.*

At this point the driver is populated with unlearned functions. To learn driver functions:

1. Select those functions that are to be learned (see figure 4-19). Then begin a learning session by pressing the **Learn** toolbar button. A series of messages and windows will guide you through the "learn" process, providing instruction on how to aim the remote, what button to press and when to release the button.
2. Save the driver by selecting **File > Save**, or you can add or learn new functions.

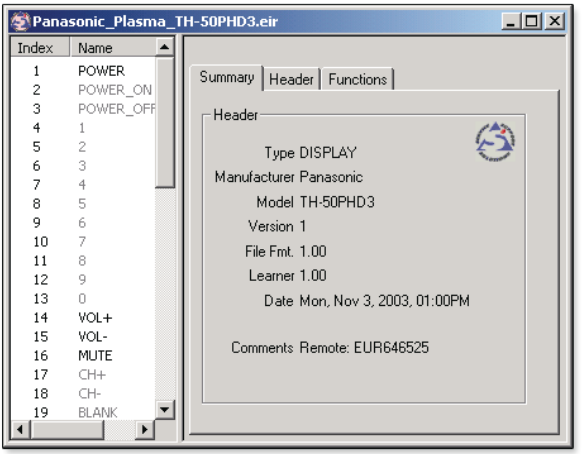


Figure 4-19 — Selecting driver functions

For more details about IR learning, refer to the IR Learner Software's help file.

Programmer's Guide for the Telnet and Web Browser

Using the command/response table

The following are either Telnet (port 23) or Web browser (port 80) commands. There are some minor differences when implementing these commands via Telnet or via URL encoding using a Web browser. All commands listed below will work using either connection method, but due to some limitations of the Web browser, the encapsulation characters are modified to make sure that the Web browser will properly handle them. All examples in the command/response table shows the proper implementation in a Telnet or Web browser session.

NOTE ***For Web browsers****: all non-alphanumeric characters must be represented as their hex equivalent such as %xx where xx equals the two character representation of the hex byte that needs to be sent (e.g., a comma would be represented as %2C).*

Telnet	Web Browser
Escape (Hex 1B)	W [must **not** be encoded]
Carriage Return (Hex 0D)	Pipe Character (|) [must **not** be encoded]

When using these commands through a Web browser, the URL reference is used below to shorten the examples. This would, in practice, be the full URL of the control interface and Web page reference including all path information (e.g., http://192.168.100.10/myform.htm).

To send any of the commands using a Web browser you need to prefix them with the full URL followed by ?cmd= (See "URL Encoding" later in this chapter).

NOTE *With Telnet you can use either the "Escape" commands or the "W" commands, and the carriage return or the pipe character. With the Web browser, you are required to use the "W" commands and the pipe character.*

In either method {Data} = Data will be directed to a specified port and **must** be encoded if non-alphanumeric.

The table on pages 4-22 through 4-31 lists the commands that the IPL T SF interface recognizes as valid, the responses that are returned to the host, a description of the command's function, or the results of executing the command.

NOTE *Upper and lower case text can be used interchangeably except where noted.*

Symbol definitions are shown below. An ASCII to HEX conversion table is also provided in figure 4-20.

ASCII to HEX Conversion Table										Esc	1B	CR	ØD	LF	ØA
	2Ø	!	21	"	22	#	23	$	24	%	25	&	26	'	27
(	28	)	29	*	2A	+	2B	,	2C	-	2D	.	2E	/	2F
Ø	3Ø	1	31	2	32	3	33	4	34	5	35	6	36	7	37
8	38	9	39	:	3A	;	3B	<	3C	=	3D	>	3E	?	3F
@	4Ø	A	41	B	42	C	43	D	44	E	45	F	46	G	47
H	48	I	49	J	4A	K	4B	L	4C	M	4D	N	4E	O	4F
P	5Ø	Q	51	R	52	S	53	T	54	U	55	V	56	W	57
X	58	Y	59	Z	5A	[	5B	\	5C	]	5D	^	5E	_	5F
`	6Ø	a	61	b	62	c	63	d	64	e	65	f	66	g	67
h	68	i	69	j	6A	k	6B	l	6C	m	6D	n	6E	o	6F
p	7Ø	q	71	r	72	s	73	t	74	u	75	v	76	w	77
x	78	y	79	z	7A	{	7B	l	7C	}	7D	~	7E	DEL	7F

Figure 4-20 — ASCII-to-HEX conversion table

Symbol definitions

↵ = CR/LF (carriage return/line feed)

← = Carriage return (no line feed)

• = Space (hard) character

X1 = Specific port number (01-99)

The port number will be represented as two ASCII characters (2 bytes) [example: port 05 would be represented as 30 35 in hex] 00 = All ports

X2 = Command data section

NOTE ***For Web encoding only*** *- Data will be directed to specified port and* ***must*** *be encoded (URL encoding) if non-alphanumeric. Since data can include either command terminator, they must be encoded as follows when used within the data section: space (hex: 20) would be encoded as %20 and plus sign (hex: 2B) would be encoded as %2B.*

X3 = Greenwich Mean Time (GMT) offset value (-12.0 to +14.0)

X5 = On/off status: 0 = off/disable; 1 = on/enable

X6 = Dirty status: 1 = RAM needs to be saved to Flash;
0 = RAM has been saved to Flash (OK to power off/reset)

X11 = Unit firmware version

X12 = Name is a text string up to 24 characters drawn from the alphabet (A-Z), digits (0-9), minus sign/hyphen (-). No blank or space characters are permitted as part of a name. No distinction is made between upper and lower case. The first character must be an alpha character. The last character must **not** be a minus sign/hyphen.

X13 = Set local date and time format (MM/DD/YY-HH:MM:SS) e.g., 11/18/03-10:54:00

Read local date and time format (day of week, date month year HH:MM:SS) e.g., Thu, 18 Nov 2003 18:19:33

X14 = IP address (xxx.xxx.xxx.xxx); leading zeros in each of four fields are optional in setting values, and are suppressed in returned values.

X15 = Mail domain name (e.g., extron.com, icia.org)

X17 = Time, in tens of milliseconds ,to wait for characters coming into a serial port before terminating (default=10=100ms, max=32767)

X18 = Hardware (MAC) address (xx-xx-xx-xx-xx-xx)

X19 = Subnet mask (xxx.xxx.xxx.xxx); leading zeros in each of four fields are optional in setting values, and are suppressed in returned values.

X20 = Time, in tens of milliseconds, to wait between characters coming into a serial port before terminating (default=2=20 ms, max=32767)

X21 = Parameter to set either **L**ength of message to receive or **D**elimiter value; # = byte count or single ASCII character decimal

X23 = Priority status for receive timeout: 0=priority set to Send Data String command parameters, 1=priority set to configure received timeout command parameters

X25 = Baud rate: 300, 600, 1200, 1800, 2400, 3600, 4800, 7200, 9600, 14400, 19200, 28800, 38400, 57600, 115200

X26 = Parity: **O**dd, **E**ven, **N**one, **M**ark, **S**pace (only first letter is needed)

X27 = Data bits: 7, 8

X28 = Stop bits: 1, 2

X29 = Port type: RS-232, RS-422, RS-485 (or 0, 1, or 2, respectively). (X29=0 for the SFI244; X29=0, 1, or 2 for SF24)

X30 = Flow control: **H**ardware, **S**oftware, **N**one (only first letter is required)

X31 = Data pacing (specified in milliseconds between bytes): 0000-1000 (default = 0 ms)

X33 = Password: maximum length of 12 characters and no special characters.

NOTE *User password cannot be assigned if no administrator password exists, and returns E14. If the administrator password is cleared, then the user password is also removed.*

X34 = Daylight saving time: 0 = off/ignore; 1 = on (use in northern hemisphere) (USA); 2 = on (Europe); 3 = on (Brazil)

X35 = Event number: range = 0 - 99 (max.)

X36 = Event buffer: 0 = receive; 1 = user (absolute); 2 = user (relative); 3 = NVRAM

X37 = Event buffer offset: range = 0 - MaxBufferSize

X38 = Event data size: **b**it; **B**yte (8 bit); **S**hort (16 bit); **L**ong (32 bit) (only first letter is required)

NOTE *This parameter is case-sensitive.*

X39 = Event data to write.

X40 = I/O mode: 0 = input; 1 = output; 2 = input plus pull-up resistor; 3 = output plus pull-up resistor; 4 = analog in; 5 = analog in w/pull-up; 6 = adjust in (requires X55 & X56 thresholds); 7 = adjust in w/pull-up (requires X55 & X56 thresholds). X55 & X56 thresholds are not required for modes 0-5.

X42 = Setting I/O: 0 = off; 1 = on

X43 = 0 = off; 1 = on; value = 0-4095, based on 12-bit A to D

X44 = Number of bytes to read

X45 = E-mail recipient number: range = 1 - 64 max

X46 = E-mail recipient address: maximum number of characters for a full e-mail address is 31 characters.

X47 = Name of e-mail file to be sent: the first line of the file is the subject, the rest is the body of the e-mail.

NOTE *E-mail files must have the file extension .eml.*

X48 = Event Status fields (8): event_type, event_state, event_paused, error_status, RcvBuff_endptr, UsrBuff_startptr, UsrBuff_endptr

X49 = Default Name: Combination of model name and last 3 pairs of MAC address (e.g., IPL-T-SFI244-00-02-3D)

X50 = Redirect: 0 = no redirect; 1-n = redirect serial port from the specified port to allow for a transparent pass-through mode

X52 = Connection's security level: 0 = not logged in; 1 = user; 2 = administrator

X53 = Timeout for data pass-through mode, after which event data can be inserted into the transmit buffer.

X54 = ASCII digit(s) representing numeric value of data element read from event buffer (leading zeros are suppressed)

X55 = Upper transition threshold (0 detection = off) for digital inputs; Lower must be smaller than upper (0-4095 based on 12-bit A to D)

X56 = Lower transition threshold (1 detection = on) for digital inputs; Lower must be smaller than upper (0-4095 based on 12-bit A to D)

NOTE *The default Web pages display X55 and X56 in voltages. (100 mV to 24 VDC, upper default = 2 VDC and lower default = 1 VDC). The conversion rate is 162 counts to 1V.*

X57 = IR playback file

X58 = IR function number

X59 = IR playback mode: 0 = play once, 1 = play continuously (send IR command again with mode = 0 to stop mode 1 playback)

X60 = IR Learn starting sample # to return (0 = return all data)

X61 = IR Learn ending sample # to return (0 = return all data)

X62 = IR Learn status: 0 = finished, but no IR seen; 1 = finished, buffer overrun; 2 = finished, successful collection; 3 = finished, but aborted; 4 = waiting for first pulse; 5 = busy collecting

X63 = Pulse time in 20 ms per count. If parameter is missing or = 0, pulse length = default (25 counts=500 ms), max (65536 counts)

X64 = Broadcast repetition rate in seconds (0-256. 0 = disable)

Copyright information

↵© COPYRIGHT 2003, EXTRON ELECTRONICS IPL T Mxx, Vx.xx↵
Thurs, 20 Feb 2003 17:51:04↵
The copyright message is displayed upon connecting to IP Link product via TCP/IP or Telnet. Mxx is the model and Vx.xx is the firmware version number. The current date and time are displayed. This is followed by a password prompt.

Password information

The "↵Password:" prompt requires a password (administrator level or user level) followed by a carriage return. The prompt is repeated if the correct password is not entered.

If the correct password is entered, the unit responds with "↵ Login Administrator↵" or "↵Login User↵", depending on the password entered. If passwords are the same for both administrator and user, the unit defaults to administrator privileges.

Error responses

When the IPL T SF interface receives a valid command, it executes the command and sends a response to the host device. If the unit is unable to execute the command because the command contains invalid parameters, it returns an error response to the host.

E10 — Invalid command
E12 — Invalid port number
E13 — Invalid parameter
E14 — Not valid for this configuration
E17 — System timed out
E22 — Busy
E24 — Privilege violation
E25 — Device not present
E26 — Maximum number of connections exceeded
E27 — Invalid event number
E28 — Bad filename/file not found

References to errors (at command descriptions on the following pages):

[10] = Commands that give E10 (Invalid command).

[24] = Commands that give E24 (privilege violation) if not administrator level.

[27] = Commands that may give E27 (invalid event number).

[28] = Commands that may give E28 (file not found).

Command	ASCII (Telnet)	URL Encoded (Web)	Response
Bidirectional serial data port			
Send data string	Esc X1*X17*X20*X21 RS←X2•	W X1 %2A X17 %2A X20 %2A X21 RS | X2	response from command↵
Configure parameters[24]	Esc X1*X25,X26,X27,X28*CP←	W X1 %2A X25 %2C X26 %2C X27 %2C X28 CP |	Cpn X1 •Ccp X25,X26,X27,X28↵
View parameters	Esc X1 CP←	W X1 CP |	X25,X26,X27,X28↵
Configure mode[24]	Esc X1*X29 CY←	W X1 %2A X29 CY |	Cpn X1 •Cty X20↵
Configure flow control[24]	Esc X1*X30,X31 CF←	W X1 %2A X30 %2C X31 CF |	Cpn X1 •Cfl X30,X31
View flow control	Esc X1 CF←	Esc X1 CF |	X30,X31↵
Configure receive timeout[24]	Esc X1*X17*X20*X23 CE←	W X1 %2A X17 %2A X20 %2A X23 CE |	Cpn X1 •Cce X17,X20,X23↵

NOTE

X1 = Specific port number (01-99)

X2 = Command data section

X17 = Time to wait for characters coming into serial port before terminating (default= 10= 100 ms, max= 32767)

X20 = Time to wait between characters coming into serial port before terminating (default= 2= 20ms, max= 32767)

X21 = Parameter to set either **L**ength of message to receive or **D**elimiter value.

X23 = Priority status for receive timeout.

X25 = Baud rate.

X26 = Parity: **O**dd, **E**ven, **N**one, **M**ark, **S**pace

X27 = Data bits: 7, 8

X28 = Stop bits: 1, 2

X29 = Port type: RS-232, RS-422, RS-485 (or 0,1, or 2, respectively). (X29=0 for the SFI244; X29=0, 1, or 2 for SF24)

X30 = Flow Control: **H**ardware, **S**oftware, **N**one

X31 = Data pacing: 0000-1000 (default= 0 ms)

Command	ASCII (Telnet)	URL Encoded (Web)	Response
View receive timeout	Esc X1CE←	WX1CE|	X17,X20,X23↵
Configure redirect mode[24]	Esc X1*X50*X53CD←	WX1%2AX50%2AX53CD|	CpnX1•CcdX50,X53↵
View redirect mode	Esc X1CD←	WX1CD|	X50,X53↵
Terminate redirect mode[24]	Esc X1*0CD←	WX1%2A0CD|	CpnX1•Ccd0,0
Flex I/O data port			
Set I/O mode (modes 0-5)	X1*X40[	X1%2AX40%5B	CpnX1•IomX40↵
Set I/O mode (modes 6-7)	X1*X40*X55*X56[	X1%2AX40%2AX55%2AX56%5B	CpnX1•IomX40,X55,X56↵
View I/O mode	X1[	X1%5B	X40,X55,X56↵
Pulse I/O state[10 14]	X1*3*X63]	X1%2A3%2AX63%5D	CpnX1•SioX5↵
Toggle I/O state[10 14]	X1*2]	X1%2A2%5D	CpnX1•SioX5↵
Set I/O state ON	X1*1]	X1%2A1%5D	CpnX1•Sio1↵
Set I/O state OFF	X1*0]	X1%2A0%5D	CpnX1•Sio0↵

NOTE

X1 = Specific port number (01-99)

X5 = On/off status: 0= off/disable; 1= on/enable

X40 = I/O mode

X43 = 0= off; 1= on; value= 0-4095, based on 12-bit A to D

X50 = Redirect: 0= no redirect; 1-n= redirect serial port from the specified port to allow for a transparent pass-through mode

X53 = Timeout for data pass-through mode, after which event data can be inserted into the transparent buffer

X55 = Upper transition threshold (0 detection= off) for digital inputs
X56 = Lower transition threshold (1 detection= on) for digital inputs
X63 = Pulse time in 20 ms per count.

Command	ASCII (Telnet)	URL Encoded (Web)	Response
View I/O state	X1]	X1%5D	X43↵
IR/serial data port (SFI244 only)			
Send IR command[28]	Esc X1 *file #,function #,* X59 IR←	W X1 %2C X57 %2C X58 %2C X59 IR|	Irs X1 *,file #,function #,* X57↵
Get IR command info[28]	Esc *file #,function #,* IR←		{description text}↵
Firmware version/part number/information			
Query firmware version	Q	Q	X11↵
Query verbose version information	0Q	0Q	sum of responses from 2Q-3Q-4Q↵
Query firmware version	1Q	1Q	X11↵
Query bootstrap version	2Q	2Q	X11↵
Query factory firmware version	3Q	3Q	X11↵ (plus web ver.-desc-UL date/time)↵
Query updated firmware version	4Q	4Q	X11↵ (plus web ver.-desc-UL date/time)↵
NOTE *An asterisk (*) placed after the version number indicates which version is currently running. A question mark (?) indicates that only the factory firmware version is loaded. A caret (^) after the version number indicates the firmware version that should be running, but a Mode 1 reset was executed. The default factory firmware version is loaded. An exclamation point (!) after the version number indicates corrupted firmware.)*			
Request part number	N	N	60-xxx-yy↵

NOTE

X1 = Specific port number (01-99)

X11 = Unit firmware version

X57 = IR playback file

X58 = IR function number

X59 = IR playback mode

Command	ASCII (Telnet)	URL Encoded (Web)	Response
Request model name	1I	1I	IPL T SF24↵ or IPL T SFI244↵
Request model description	2I	2I	Two Bi-Directional Serial Ports [RS232], Four Flex I/O, Four IR Ports↵
Request system memory usage	3I	3I	# Bytes/Kbytes used out of # Kbytes↵
Request user memory usage	4I	4I	# Bytes/Kbytes used out of # Kbytes↵
IR setup commands			
Set Unit name[24]	Esc X12 CN↵	W X12 CN|	Ipn•X12↵
Set Unit name to factory default[24]	Esc•CN↵	W%20CN|	Ipn•X49↵
Read Unit name	Esc CN↵	WCN|	X12↵
Set time/date[24]	Esc X13 CT↵	W X13 CT|	Ipt•X13↵
Read time/date	Esc CT↵	WCT|+	X13↵
Set GMT offset[24]	Esc X3 CZ↵	W X3 CZ|+	Ipz X3↵
Read GMT offset	Esc CZ↵	WCZ|	X3↵
Set daylight savings time [24]	Esc X34 CX↵	W X34 CX|	Ipx X34↵

NOTE

X3 = Greenwich Mean Time (GMT) offset value (-12.0 to +14.0)

X12 = Name is a text string up to 24 characters drawn from the alphabet, digits, minus sign/hyphen. No blank or space characters are permitted.

X13 = Set local date and time format

X34 = Daylight savings time: 0 = off/ignore; 1= on (use in northern hemisphere) (USA); 2 = on (Europe); 3 = on (Brazil)

X49 = Default Name: combination of model name and last 3 pairs of MAC address

Command	ASCII (Telnet)	URL Encoded (Web)	Response
Read daylight savings time	Esc CX ↵	WCX|	X34 ↵
Set DHCP on[24]	Esc 1DH ↵	W1DH|	Idh1 ↵
Set DHCP off[24]	Esc 0DH ↵	W0DH|	Idh0 ↵
View DHCP mode	Esc DH ↵	WDH|	X5 ↵
Set IP address[24]	Esc X14 CI ↵	W X14 CI|	Ipi • X14 ↵
Read IP address	Esc CI ↵	WCI|	X14 ↵
Read hardware address (MAC)	Esc CH ↵	WCH|	X18 ↵
Set subnet mask[24]	Esc X19 CS ↵	W X19 CS|	Ips • X19 ↵
Read subnet mask	Esc CS ↵	WCS|	X19 ↵
Set gateway IP address[24]	Esc X14 CG ↵	W X14 CG|	Ipg • X14 ↵
Read gateway IP address	Esc CG ↵	WCG|	X14 ↵
Set administrator password[24]	Esc X33 CA ↵	W X33 CA|	Ipa • X33 ↵
Clear administrator password[24]	Esc • CA ↵	W%20CA|	Ipa • ↵
Read administrator password[24]	Esc CA ↵	WCA|	X33 ↵

NOTE

X5 = On/off status: 0= off/disable; 1= on/enable

X14 = IP address

X18 = Hardware (MAC) address

X19 = Subnet mask

X33 = Password: maximum length of 12 characters and no special characters

X34 = Daylight savings time: 0= off/ignore; 1= on (use in northern hemisphers) (USA); 2 = on (Europe); 3 = on (Brazil)

Command	ASCII (Telnet)	URL Encoded (Web)	Response
Set user password[24]	Esc X33 CU ↵	W X33 CU |	Ipu • X33 ↵
Clear user password[24]	Esc • CU ↵	W%20CU |	Ipu • ↵
Read user password[24]	Esc CU ↵	WCU |	X33 ↵
Set verbose mode	Esc X5 CV ↵	W X5 CV |	Vrb X5 ↵
Read verbose mode	Esc CV ↵	WCV |	X5 ↵
Read connection's security level	Esc CK ↵	WCK |	X52 ↵
Configure broadcast mode	Esc X64 EB ↵	W X64 EB |	Bmd X64 ↵
View broadcast mode	Esc EB ↵	WEB |	X64 ↵
Get connection listing	Esc CC ↵	WCC |	
File commands			
Get listing	Esc DF ↵	WDF |	
	Telnet text responses:	**Web responses:**	
	filename x • date/time • length ↵	var file - new Array():	
	filename x • date/time • length ↵	file [1] = 'filename1, date1, filesize1';	
	filename x • date/time • length ↵	file [2] = 'filename2, data2, filesize2';	
	...	...	
	space_remaining • bytes left ↵ ↵	file [n] = 'filename n, date n, filesize n';	
		file [n+1] = 'space remaining, bytes left'	

NOTE

X5 = On/off status: 0= off/disable; 1= on/enable

X33 = Password: maximum length of 12 characters and no special characters

X52 = Connection's security level: 0= not logged in; 1= user; 2= administrator

X64 = Broadcast repetition rate in seconds (0-256. 0= disable)

Command	ASCII (Telnet)	URL Encoded (Web)	Response
Stream files via Telnet or RS-232			
Load file to user flash memory[24 28]	Esc+UF, *filesize*, *filename*↵ *raw unprocessed data from the file up to filesize* Up1↵		
Retrieve file from user flash memory[28]	Esc *filename* SF↵ *responds with a 4 bytes filesize and raw unprocessed data from the file*		
Stream files via port 80			
Load file to user flash memory	Use a POST on port 80, followed by the delimited data to be written to the flash file memory		
Retrieve file from user flash memory	Send a page GET on port 80 followed by: WSF| *+ responds with raw, unprocessed data in file* (e.g. http://192.168.254.254/mypage.html?cmd=WSF|)		
Re-map port designations			
Set Telnet port map[24]	Esc*port#*MT↵	W*port#*MT|	Pmt*port#*↵
Reset Telnet port map[24]	Esc23MT↵	W23MT|	Pmt00023↵
Disable Telnet port map[24]	Esc0MT↵	W0MT|	Pmt00000↵
Read Telnet port map[24]	EscMT↵	WMT|	*port#*↵
Set Web port map[24]	Esc*port#*MH↵	W*port#*MH|	Pmh*port#*↵
Reset Web port map[24]	Esc80MH↵	W80MH|	Pmh00080↵
Disable Web port map[24]	Esc0MH↵	W0MH|	Pmh00000↵
Read Web port map[24]	EscMH↵	WMH|	*port#*↵
Set Direct Access port map[24]	Esc*port#*MD↵	W*port#*MD|	Pmd*port#*↵
Reset Direct Access port map[24]	Esc2001MD↵	W2001MD|	Pmd02001↵
Disable Direct Access port map[24]	Esc0MD↵	W0MD|	Pmd00000↵

Command	ASCII (Telnet)	URL Encoded (Web)	Response
Read Direct Access port map[24]	Esc MD ←	WMD|	*port#* ↵
Web browser specific			
Read response from last URL command	Esc UB ←	WUB||	Response from command ↵
E-mail			
Configure e-mail events[24]	Esc X45,X46,X47 CR ↵	W X45,X46,X47 CR|	Ipr X45,X46,X47 ↵
Read e-mail events	Esc X45 CR ←	W X45 CR|	X46,X47 ↵
Send e-mail (event)[24]	Esc X45 SM ←	W X45 SM|	Eml X45 ↵
Set mail server IP, domain name[24]	Esc X14,X15 CM ←	W X14 %2C X15 CM|	Ipm X14,X15 ↵
Read mail server IP, domain name	Esc CM ←	W X14 %2C X15 CM|	X14,X15 ↵

NOTE

X14 = IP address

X15 = Mail domain name

X35 = Event number: range= 0-99 (max.)

X36 = Event buffer: 0= receive; 1= user (absolute); 2= user (relative); 3=NVRAM

X37 = Event buffer offset: range= 0-MaxBufferSize

X38 = Event data size: **b**it; **B**yte (8 bit); **S**hort (16 bit); **L**ong (32 bit)

X45 = E-mail recipient number: range= 1-64 max.

X46 = E-mail recipient address: max. number of characters for full e-mail address is 31 characters

X47 = Name of e-mail file to be sent

X54 = ASCII digit(s) representing numeric value of data element read from event buffer

Command	ASCII (Telnet)	URL Encoded (Web)	Response
Event control			
Read event buffer memory[27]	Esc X35,X36,X37,X38E←	WX35,X36,X37,X38E|	X54↵
Read event status[27]	Esc X35E←	WX35E|	<see X48>↵
Write event memory[24 27]	Esc X35,X36,X37,X39,X38E←	WX35,X36,X37,X39,X38E|	Evt X39↵
Read string from event memory[27]	Esc X34,X36,X37,X44FE←	WX35,X36,X37,X44FE|	*string*↵
Write string to event memory[24 27]	Esc X39*X35,X36,X37FE←	WX39%2AX35,X36,X37FE|	Evt X39↵
Start events[24 27]	Esc1AE←	W1AE|	Ego↵
Stop events[24 27]	Esc0AE←	W0AE|	Est↵
Read number of events running	EscAE←	WAE|	Enm#↵
Reset (zap)/erase commands			
Erase user-supplied Web page and files[24 28]	Esc*filename*EF←	W*filename*EF|	Del•*filename*↵

NOTE

X6 = Dirty status: 1= RAM needs to be saved to Flash; 0= RAM has been saved to Flash (OK to power off/reset)

X35 = Event number: range= 0-99 (max.)

X36 = Event buffer: 0= receive; 1= user (absolute); 2= user (relative); 3=NVRAM

X37 = Event buffer offset: range= 0-MaxBufferSize

X38 = Event data size: **b**it; **B**yte (8 bit); **S**hort (16 bit); **L**ong (32 bit))

X39 = Event data to write

X44 = Number of bytes to read

X48 = Event status fields

Command	ASCII (Telnet)	URL Encoded (Web)	Response
Erase flash memory[24]	Esc ZFFF ←	WZFFF|	Zpf ↵
Reset all device settings to factory[24]	Esc ZXXX ←	WZXXX|	Zpx ↵
Absolute system reset[24]	Esc ZQQQ ←	WZQQQ|	Zpq ↵
(Includes IP address= 192.168.254.254, subnet mask= 255.255.0.0)			
Commit RAM to flash	Esc 1FF ←	W1FF|	Nvr X6 ↵ (responds when done)
View whether RAM needs to be saved to Flash	Esc FF ←	WFF|	X6 ↵

NOTE X6 = Dirty status: 1= RAM needs to be saved to Flash; 0= RAM has been saved to Flash (OK to power off/reset)

Customization

In the IPL T SF interface family, varying degrees of customization are possible. Server Side Includes make it possible to obtain information from the unit and display the information on Web pages. URL encoding allows you to send information and commands to the unit to change its configuration or provide you with feedback.

Server Side Includes

Server Side Includes (SSIs) are a type of HTML comment that directs the Web server to dynamically generate data for a Web page whenever it is requested. SSIs typically use Extron's Simple Instruction Set (SIS) to communicate commands to the products or attached control devices. Using SSIs, custom pages can be designed and displayed, with IPL T SF interface information provided by the SIS commands.

The basic format for an Extron SSI is

<!—#echo var="x"—>
Where x is the SIS command to be executed.

The SIS instructions sent to IP Link-enabled products fall into two categories: "host" or "remote".

- **Host** commands instruct the IP Link product to act or respond.
- **Remote** commands pass data to an external control port on an IP Link product.

When a Web page is requested, the Web server removes the SSI and replaces it with the answer to the SIS command within quotes.

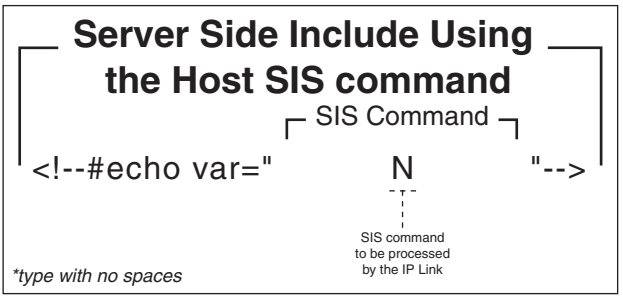


Figure 4-21 — Example of SSI "host" command

In figure 4-21 above, the "N" command is used to request the IP Link product's part number.

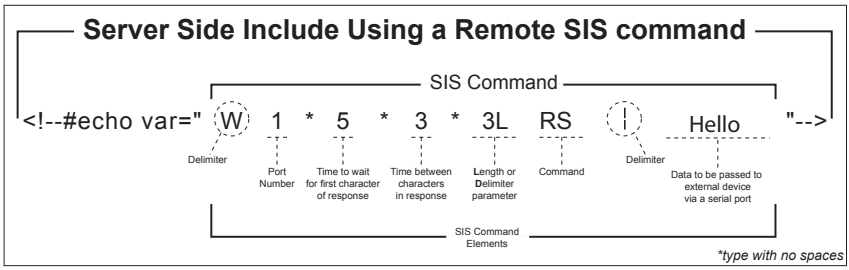

Server Side Include Using a Remote SIS command
SIS Command
<!--#echo var="
W
1 * 5 * 3 * 3L
RS
I
Hello
"-->
Delimiter
Port Number
Time to wait for first character of response
Time between characters in response
Length or Delimiter parameter
Command
Delimiter
Data to be passed to external device via a serial port
SIS Command Elements
*type with no spaces

Figure 4-22 — Example of SSI "remote" command

In figure 4-22 above, a "remote" serial command sends the word "hello" and waits up to 50 ms for a response (until three characters are received). For more information on this command, refer to the "Programmer's Guide for the Telnet and Web Browser," earlier in this chapter.

Query string

A query string is the portion of a URL that appears after the question mark. The query string contains parameters or instructions for the Web server to execute.

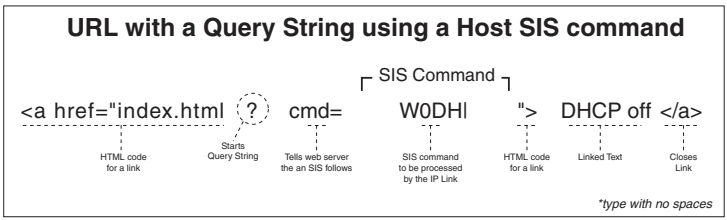
The basic format for a query string within a link is

Input #1
Where x is the SIS command to be executed.

When a link is accessed on a Web page, the URL is passed to the Web server to tell it which Web page to return to the browser. The portion of the URL after the question mark is the query string, which contains the SIS command that the IP Link product will remove and execute.

As with SSI formatted commands, query strings can use any valid SIS command—either "host" or "remote".

The query string in figure 4-23 below turns off DHCP on the IP Link device.


URL with a Query String using a Host SIS command
SIS Command
<a href="index.html
?
cmd=
W0DHI
">
DHCP off

HTML code for a link
Starts Query String
Tells web server the an SIS follows
SIS command to be processed by the IP Link
HTML code for a link
Linked Text
Closes Link
*type with no spaces

Figure 4-23 — Example of a host query string command

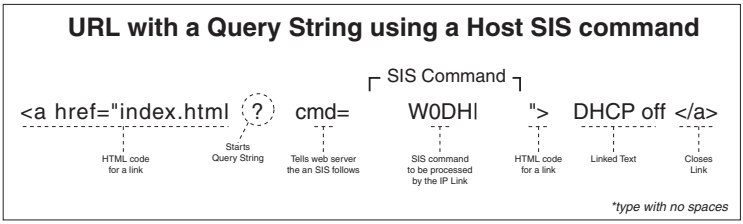


Figure 4-24 — Example of a remote query string command

In figure 4-24 above, the data string that follows the pipe (|) symbol is sent to the attached controlled device on serial port #2. This string will instruct an attached Extron switcher to change to input #1.

Code examples

This section shows practical uses for both SSIs and query strings.

NOTE *Before attempting to develop new Web pages, the user should have a good, working knowledge of JavaScript, HTML, and server side includes.*

Example 1

In figure 4-25a, both host SSI and remote SSI commands are used within the same Web page. You will notice six SSIs: three host commands and three remote commands.

```
<html>
<head><title>Example 1</title></head>
<h2 b>HTML Example #1</h2 b>
<body>
The following lines demonstrate how to read status from the IPLink Product:
<p>
IPLink Product Name: <b><!--#echo var="1I"--></b>
<br>
IPLink Product Description: <b><!--#echo var="2I"--></b>
<br>
IPLink Product Part Number: <b><!--#echo var="N"--></b>
<br><hr>
<p>
This example requires an Extron Crosspoint 84HVA connected to IPL T SF244
serial
port #1.
<p>
Part Number: <b><!--#echo var="W01RSIN"--></b>
<br>
Connection Info: <b><!--#echo var="W01RSII"--></b>
<br>
Firmware Version: <b><!--#echo var="W01RSIQ"--></b>
```

"host" SSI commands

"remote" SSI commands

Figure 4-25a — HTML source code document showing Server Side Includes

The host SSI commands in figure 4-25a request the product name, product description and product part number of an IP Link device. The remote SSI commands request the part number, connection information and firmware version of an attached serial device.

```
<html>
<head><title>Example 1</title></head>
<h2 b>HTML Example #1</h2 b>
<body>
The following lines demonstrate how to read status from the IPLink Product:
<p>
IPLink Product Name: <b>IPL T SFI244</b>
<br>
IPLink Product Description: <b>Two Bi-Directional Serial Ports [RS232], Four
Flex I/O, Four IR Ports</b>
<br>
IPLink Product Part Number: <b>60-544-06</b>
<br><hr>
<p>
This example requires an Extron Crosspoint 84HVA connected to IPL T SFI244
serial port #1.
<p>
Part Number: <b>N60-337-01%0D%0A</b>
<br>
Connection Info: <b>V08X04 A08X04 Exe0%0D%0A</b>
<br>
Firmware Version: <b>Ver2.02%0D%0A</b>
```

Figure 4-25b — Resulting HTML source code served by an IP Link Web server

Notice, in figure 4-25b, that the commands executed by the IP Link box in response to SSI references have been replied to, and were implemented when the Web page was served to the browser as seen below.

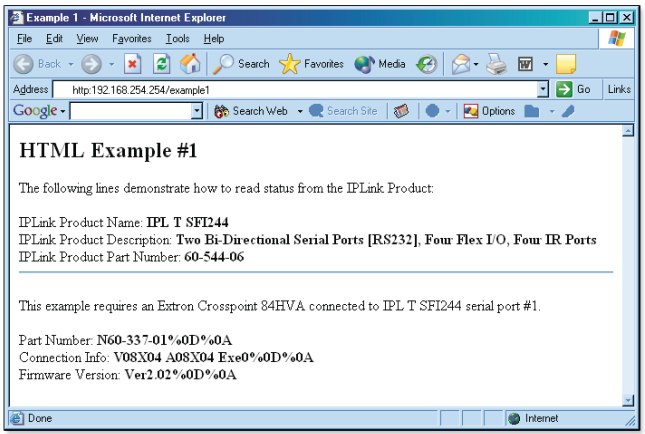

Example 1 - Microsoft Internet Explorer
File Edit View Favorites Tools Help
Back Search Favorites Media
Address http://192.168.254.254/example1
Go Links
Google Search Web Search Site Options
HTML Example #1
The following lines demonstrate how to read status from the IPLink Product:
IPLink Product Name: IPL T SFI244
IPLink Product Description: Two Bi-Directional Serial Ports [RS232], Four Flex I/O, Four IR Ports
IPLink Product Part Number: 60-544-06
This example requires an Extron Crosspoint 84HVA connected to IPL T SFI244 serial port #1.
Part Number: N60-337-01%0D%0A
Connection Info: V08X04 A08X04 Exe0%0D%0A
Firmware Version: Ver2.02%0D%0A
Done
Internet

Figure 4-25c — Browser view

Example 2

The example below (figure 4-26a) shows how a simple hyperlink and a remote query string can be used to build a Web page that can control a device.

```
<html>
<head><title>Example 2</title></head>
<h2><b>HTML Example 2</b></h2>
<body>
The following lines demonstrate how to send commands to RS-232 Com Port #1
of an IPLink Product:
<p>
<a href="index.html?cmd=W01RSI1!">Select Input #1</a>
<br>
<a href="index.html?cmd=W01RSI2!">Select Input #2</a>
</p>
</body>
</html>
```

Figure 4-26a — HTML source code showing multiple hyperlinks using query strings

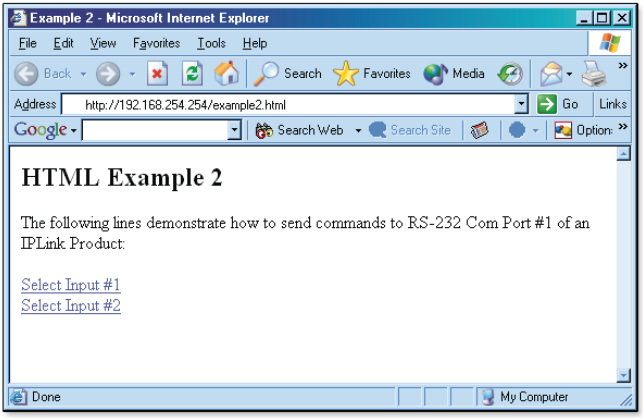

Example 2 - Microsoft Internet Explorer
File Edit View Favorites Tools Help
Back Search Favorites Media
Address http://192.168.254.254/example2.html
Go Links
Google Search Web Search Site Option
HTML Example 2
The following lines demonstrate how to send commands to RS-232 Com Port #1 of an IPLink Product:
Select Input #1
Select Input #2
Done
My Computer

Figure 4-26b — Browser view

Example 3

This example shows how the flex I/O outputs can be controlled using a query string and the SIS commands.

```
<html>
<head><title>Example 3</title></head>
<h2><b>HTML Example 3</b></h2>
<body>
The following lines demonstrate how to send commands to an IP Link Product:
<p>
<a href="index.html?cmd=1*1]">Set Digital Output On</a>
<br>
<a href="index.html?cmd=1*0]">Set Digital Output Off</a>
</p>
</body>
</html>
```

Figure 4-27a — HTML source code using a query string

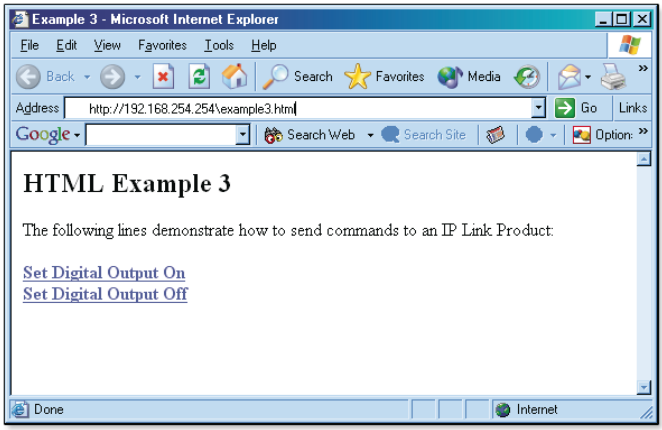

Example 3 - Microsoft Internet Explorer
File Edit View Favorites Tools Help
Back Search Favorites Media
Address http://192.168.254.254\example3.html
Go Links
Google Search Web Search Site Option
HTML Example 3
The following lines demonstrate how to send commands to an IP Link Product:
Set Digital Output On
Set Digital Output Off
Done
Internet

Figure 4-27b — Browser view

Example 4

The flex I/O can also be configured as an input. In this example, two inputs are connected to a System 8 Plus switcher. Using JavaScript, the status of the digital inputs can be checked and the appropriate message displayed for the user.

```
<html>
<head><title>Example 4</title></head>
<h2><b>HTML Example #4</b></h2>
<body>
<p>
<script>
var ioState1 = "<!--#echo var="1"-->"
var ioState2 = "<!--#echo var="2"-->"
 if ((ioState1 == 1) && (ioState2 == 0)) {
 document.write('Input #1 Selected')
 }
 else if ((ioState1 == 0) && (ioState2 == 1)) {
 document.write('Input #2 Selected')
 }
 else {
 document.write('No Input Selected')
 }
</script>
</p>
<p>
<a href="index.html?cmd=3*25*3]">Select Input #1</a>
<br>
<a href="index.html?cmd=4*25*3]">Select Input #2</a>
</p>
</body>
</html>
```

Figure 4-28a — HTML source code showing server side includes

Using the SSI to assign the state of input 1 and 2 allows the JavaScript code to determine which switcher input is selected. This example also demonstrates using a URL query string in conjunction with the pulse I/O command to allow the user to switch the System 8 with a 250 ms closer.

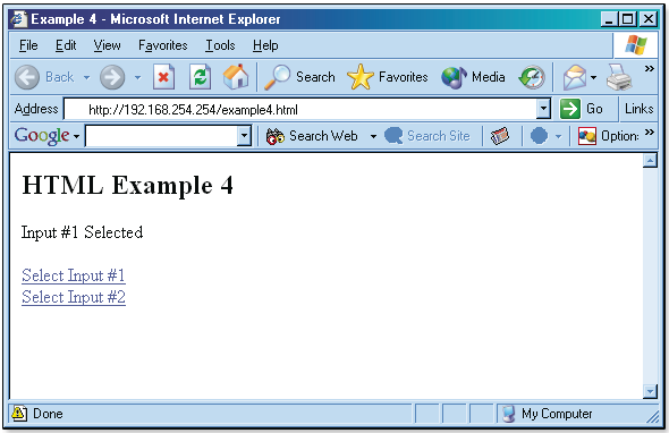


Figure 4-28b — Browser view

Example 5

This example demonstrates how to send out an IR string from the IPL T SFI244. The line below shows an HTML hyperlink with an Extron IR command encoded into the URL.

Play

The **? cmd=W1*1*15*0ir|** is the syntax for the URL encoding of an IR command that will be sent out of IR port #1. The "W" and the "|" (pipe symbol) are used as the leading and trailing delimiters for the instruction that tells the box which port number, .eir file or function within the .eir file to send. The command also allows the programmer to define whether the IR should be sent once or continuously until stopped. The IR Learner program determines which IR function, such as play, is assigned to which number. See the IR Learner program for help with this feature.

```
<html>
<head><title>Example #5</title></head>
<h2><b>Example 5</b></h2>
<body>
<p>
This example demonstrates how to send out an IR string from an IR file (1.eir) on IR
Port #1 from the IPL T SFI244. This IR driver must be loaded on the IPL T SFI244 in
order to send out the string.
</p>
<p>
<a href="index.html?cmd=W1*1*15*0ir|">Play</a>
</p>
<p>
<a href="index.html?cmd=W1*1*32*0ir|">Stop</a>
</p>
</body>
</html>
```

Figure 4-29a — HTML source code showing an IR string from the IPL T SFI244

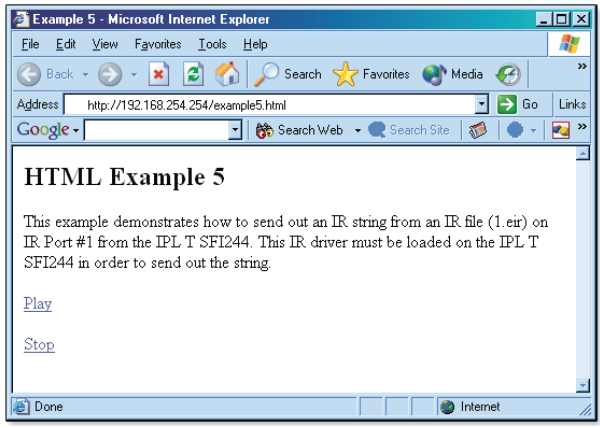

Example 5 - Microsoft Internet Explorer
File Edit View Favorites Tools Help
Back Search Favorites Media
Address http://192.168.254.254/example5.html
Go Links
Google Search Web Search Site
HTML Example 5
This example demonstrates how to send out an IR string from an IR file (1.eir) on IR Port #1 from the IPL T SFI244. This IR driver must be loaded on the IPL T SFI244 in order to send out the string.
Play
Stop
Done
Internet

Figure 4-29b — Browser view

Example 6

The example below (figure 4-30a) shows how you can use JavaScript to parse the response from a CrossPoint Ultra 84 HVA switcher and produce a formatted Web page.

```
<html>
<head><title>Example 6</title>
<script language="javascript">
xOut1 = "<!--#echo var="W01RS|V01%25"-->";
xOut2 = "<!--#echo var="W01RS|V02%25"-->";
xOut3 = "<!--#echo var="W01RS|V03%25"-->";
xOut4 = "<!--#echo var="W01RS|V04%25"-->";
</script>
</head>
<h2 b>HTML Example #6</h2 b>
<body>
This example requires an Extron Crosspoint 84HVA connected to IPL T SFI244 serial port #1.
<p>
<b>Sample links that can be followed</b>
<br>
<a href="http://192.168.254.254/example#6.html?cmd=W01RS|5*1!">
http://192.168.254.254/example#6.html?cmd=W01RS|5*1!<a><i> -Creates tie from input 5 to output 1</i>
<br>
<a href="http://192.168.254.254/example#6.html?cmd=W01RS|1*2!">
http://192.168.254.254/example#6.html?cmd=W01RS|1*2!<a><i> -Creates tie from input 1 to output 2</i>
<br>
<b>Response to last URL encoded command: </b> <!--#echo var="WUBI"-->
<br><hr>
The following lines demonstrate reading the output status of the Crosspoint.
<br>
<p><b>_____Unformatted Response:</b>
<br>
Output 1 Setup: <!--#echo var="W01RS|V01%25"-->
<br>
Output 2 Setup: <!--#echo var="W01RS|V02%25"-->
<br>
Output 3 Setup: <!--#echo var="W01RS|V03%25"-->
<br>
Output 4 Setup: <!--#echo var="W01RS|V04%25"-->
<br><hr>
Here is an example of formatting the results using Javascript in your HTML.
<br>
<p><b>_____Formatted Response:</b><p>
<script>
<!--
var x1Split= xOut1.split(" ");
var In1Split= x1Split[1].split("n");
document.write("Output 01 tied to Input " + In1Split[1] + "<br>");
var x2Split= xOut2.split(" ");
var In2Split= x2Split[1].split("n");
document.write("Output 02 tied to Input " + In2Split[1] + "<br>");
var x3Split= xOut3.split(" ");
var In3Split= x3Split[1].split("n");
document.write("Output 03 tied to Input " + In3Split[1] + "<br>");
var x4Split= xOut4.split(" ");
var In4Split= x4Split[1].split("n");
document.write("Output 04 tied to Input " + In4Split[1] + "<br>");
// -->
</script>
<br>
</body>
</html>
```

Figure 4-30a — HTML source code using JavaScript to display CrossPoint 8HVA responses

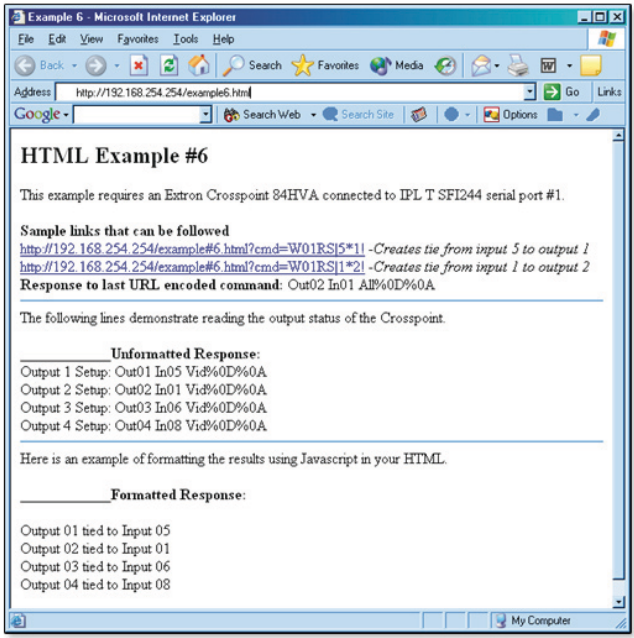

Example 6 - Microsoft Internet Explorer
File Edit View Favorites Tools Help
Address http://192.168.254.254/example6.html
HTML Example #6
This example requires an Extron Crosspoint 84HVA connected to IPL T SFI244 serial port #1.
Sample links that can be followed
http://192.168.254.254/example#6.html?cmd=W01RS|5*1| -Creates tie from input 5 to output 1
http://192.168.254.254/example#6.html?cmd=W01RS|1*2| -Creates tie from input 1 to output 2
Response to last URL encoded command: Out02 In01 All%0D%0A
The following lines demonstrate reading the output status of the Crosspoint.
Unformatted Response:
Output 1 Setup: Out01 In05 Vid%0D%0A
Output 2 Setup: Out02 In01 Vid%0D%0A
Output 3 Setup: Out03 In06 Vid%0D%0A
Output 4 Setup: Out04 In08 Vid%0D%0A
Here is an example of formatting the results using Javascript in your HTML.
Formatted Response:
Output 01 tied to Input 05
Output 02 tied to Input 01
Output 03 tied to Input 06
Output 04 tied to Input 08
My Computer

Figure 4-30b — Browser view

URL encoding

URL encoding is the method of using ASCII hexadecimal characters to display specific characters in a URL. URL encoding is used for several reasons. On some operating systems, certain characters are unsafe or not available, and others are reserved by the HTML or URL specification. URL encoding is used to ensure compatibility and functionality with most Internet browsers. As a general rule, use the hexadecimal encoding method shown below when these characters appear in your URLs.

The following types of characters *do not* require encoding in a URL.

alphanumerics	0-9 a-z A-Z
special characters	$ _ _ . + ! * ( ) ,
reserved characters	; / ? : @ = & When used for their reserved purposes, these characters do not require encoding within a URL.

Reserved characters

Reserved characters should not be encoded when they appear in their conventional meaning in a URL. For example, do not encode the slash (/) when using it as part of the URL syntax. Only encode unsafe characters (defined below) in your URLs.

The following table lists reserved characters.

Characters		Hex	Dec
$	Dollar	24	36
&	Ampersand	26	38
+	Plus	2B	43
,	Comma	2C	44
/	Forward Slash / Virgule	2F	47
:	Colon	3A	58
;	Semi-colon	3B	59
=	Equal	3D	61
?	Question Mark	3F	63
@	"At" Symbol	40	64

Unsafe characters

URLs use some characters for "special use" in defining their syntax and these characters should be encoded. For various reasons, these characters present the *possibility* of being misunderstood within a URL.

The following table lists unsafe characters.

Characters		Hex	Dec
	Space	20	32
" "	Quotation Marks	22	34
<	"Less Than" Symbol	3C	60
>	"Greater Than" Symbol	3E	62
#	Pound	23	35
%	Percent	25	37
Miscellaneous Characters			
{	Left Curly Brace	7B	123
}	Right Curly Brace	7D	125
|	Vertical Bar / Pipe	7C	124
\	Backslash	5C	92
^	Caret	5E	94
~	Tilde	7E	126
[	Left Square Bracket	5B	91
]	Right Square Bracket	5D	93
`	Grave Accent	60	96

A/V Device Control

Control of A/V devices may be accomplished in any of several ways once the IPL T SF interface has been connected and configured. These include Web pages, Telnet, and direct port access.

Custom Web pages

These pages can either be modified versions of the existing Web pages, or new Web pages developed in the field.

Web page development can be done with a Web site development tool such as Frontpage or Dreamweaver. Custom Web pages are loadable with the Web server File Manager (see "Managing files" earlier in this chapter).

Telnet (Port 23)

Telnet, short for Telecommunications Network, provides a way for you to connect to a computer or server (in this case the IPL T SF interface) on a network. Once connected via Telnet, you can send ASCII serial commands (see the "Programmer's Guide for the Telnet and Web Browser" earlier in this chapter) to control devices connected to the interface through both serial ports. Telnet only works in RS-232 mode.

Accessing and using Telnet

1. Click **Start**, then **Run** and type "Telnet". Click **OK**. The Telnet program starts (see figure 4-31).
2. At the command prompt, type "open" and press **Enter**.
3. At the < to > prompt, type the IP address of the IPL T SF unit. (The default IP address is 192.168.254.254, but it may have been changed in the setup or configuration process. If it was changed, use the new address.) Telnet defaults to port 23.

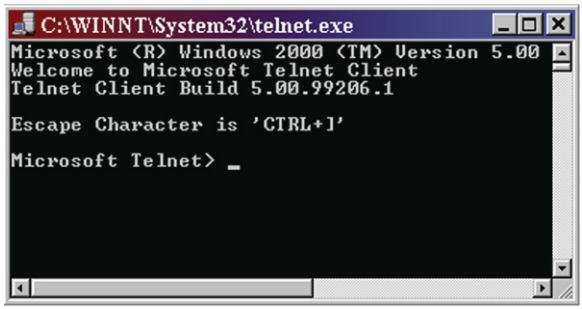

C:\WINNT\System32\telnet.exe
Microsoft (R) Windows 2000 (TM) Version 5.00
Welcome to Microsoft Telnet Client
Telnet Client Build 5.00.99206.1
Escape Character is 'CTRL+]'
Microsoft Telnet> _

Figure 4-31 — Telnet command prompt

4. If passwords were set up for the connected system, you will be prompted to log in as Administrator or User. Otherwise, the system responds with a <cr/lf>.

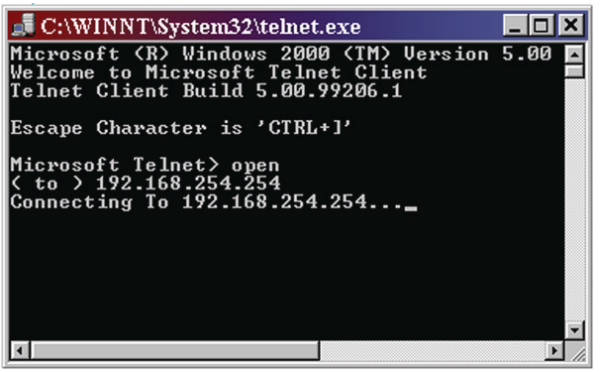


Figure 4-32 — Connecting to the IP address

5. Once you are connected, you can enter serial (ASCII) commands as desired.
6. When you are through entering commands to the interface, type "quit" at the command prompt to quit Telnet.

Direct port access (ports 2001 through 2002)

Direct access allows a direct, one-to-one connection to any of the serial ports using a reserved IP port number:

COM1: **direct access port #2001**

COM2: **direct access port #2002**

When a TCP session is initiated to port 2001 through port 2002, all data sent and received passes directly to and from that port without any processing. Serial port parameters should be set via a Telnet connection prior to using direct access.

Using direct access

1. Access the unit via Telnet and configure the COM port parameters as desired using serial commands (see the "Command/response table" earlier in this chapter).
2. Close the initial Telnet session.
3. Open a direct access Telnet session to the selected port by entering the IP address followed by a space then the port number (e.g., 192.168.244.244 2001).
4. Send serial commands directly through the selected COM port to the attached A/V device.

5. Close the Telnet session to end the direct access session.

NOTE *You can force the direct access session closed by logging on as Administrator and entering "Esc X1 * 0CD←", where X1 is the selected COM port.*

Port redirect

Using the port redirector, either serial port can be configured as a pass-through connection, allowing data to be sent and received directly to and from the serial port back to the client (PC) without any processing. In figure 4-33, a MediaLink® controller connected to serial port 1 (COM1) is controlling a projector and input devices connected to serial port 2 (COM2).

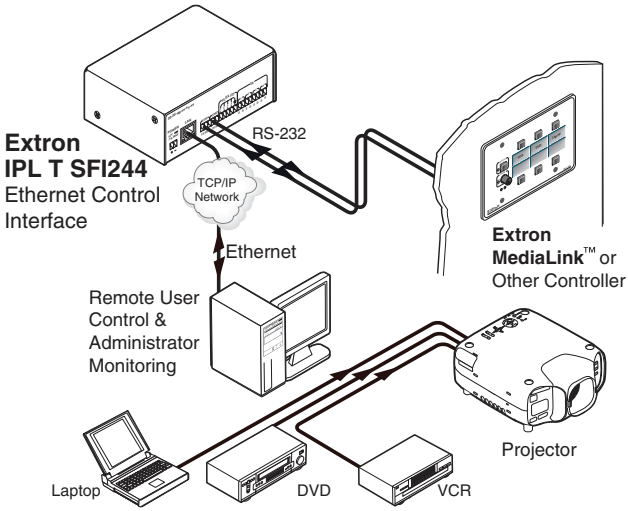


Figure 4-33 — Pass-through mode

Port redirect can also be used in conjunction with Extron's Serial Link Software (refer to the *Serial Link Software User's Guide*) to set up virtual COM ports on a PC or laptop, to monitor COM port data and pass it to the LAN, or to set up a projector or other RS-232 controlled A/V devices via the IPL T SF interface. Port redirect is enabled with an SIS command (see the "Command/response table" earlier in this chapter).

Troubleshooting

Turn on output device(s) (plasma screens, monitors, projectors), the IPL T SF control interface and the control devices (PC, laptop, etc.).

If the output A/V device cannot be remotely controlled, check the following:

Power connections

1. Ensure that all devices are plugged in.
2. Make sure that each device is receiving power. The interface's front panel power LEDs light if the device is receiving power.

Data connections

1. Check the cabling connections and make adjustments as needed. The Link LEDs on the IPL T SF control interface and the computer should be solid green if a network connection is detected. If these LEDs are not lit, either the cable is faulty or not plugged in, or the wrong type of cable is being used (refer to "Connecting the Hardware", in chapter 3).
2. Try to 'ping' the unit by typing "ping 192.168.254.254" at the DOS command prompt, or use the Web address provided to you by your system administrator. If you get no response:
   a. Make sure your unit is using the appropriate subnet mask (check with your system administrator).
   b. Make sure your PC does not have a software firewall program which might block the IP address of the unit.
3. If contact is established with the unit, but the unit's Web pages cannot be accessed by your Web browser, verify (in the Options or Preferences menu) that your Web browser is configured for direct network connection and not set up to use a proxy server.

If you are still experiencing problems, call the Extron S^3 Sales & Technical Support Hotline if needed. See the back of this manual for the telephone number for your region.

Appendix A

Specifications, Part Numbers, and Accessories

Specifications

Part Numbers and Accessories

Specifications

Ethernet control interface

Connectors	1 RJ-45 female connector
Data rate	10/100Base-T, half/full duplex with autodetect
Protocols	ARP, DHCP, ICMP (ping), TCP/IP, UDP/IP, Telnet, HTTP, SMTP
Default settings	Link speed and duplex level = autodetected IP address = 192.168.254.254 Subnet mask = 255.255.0.0 Gateway = 0.0.0.0 DHCP = off
Web server	Up to 200 simultaneous sessions
IPL T SF24	1.25 MB nonvolatile user memory
IPL T SFI244	7.25 MB nonvolatile user memory
Program control	Extron's Simple Instruction Set (SIS™)
Global Viewer requirements	Microsoft® Internet Explorer ver. 6 or higher

Serial control interface

Quantity/type	
IPL T SF24	2 RS-232/RS-422/RS-485 configurable serial
IPL T SFI244	2 RS-232 only
Connectors	
IPL T SF24	(2) 9-pin male D and (1) 3.5 mm captive screw connector, 5 pole
IPL T SFI244	(1) 3.5 mm captive screw connector, 5 pole
Baud rate and protocol	300 to 115200 baud Default settings (adjustable): 9600 baud, 8 data bits, 1 stop bit, no parity
Pin configurations	
Serial, 9-pin D — IPL T SF24	
RS-232 (default)	2 = RX, 3 = TX, 5 = GND, 7 = RTS, 8 = CTS
RS-422	2 = RX-, 3 = TX-, 5 = GND, 7 = TX+, 8 = RX+
RS-485	2 and 3 (tied together) = data-, 5 = GND, 7 and 8 (tied together) = data+
Serial, 5-pole captive screw — both models	
	COM1: pin 1 = TX, 2 = RX, 3 = GND COM2: pin 4 = TX, 5 = RX, 3 = GND

Flex I/O control interface

Quantity/type	4 analog input or digital input/output(configurable)
Connectors	(1) 3.5 mm captive screw connector, 5 pole

Digital inputs

Input voltage range	0 to 24 VDC, clamped at +30 VDC
Input impedance	28k ohms
Programmable pullup	2k ohms to +5 VDC
Threshold low to high	Programmable range: 100 mV to 24 VDC, default = 2 VDC
Threshold high to low	Programmable range: 100 mV to 24 VDC, default = 1 VDC
Digital outputs	250 mA sink from 24 VDC max.
Analog inputs	12 bit A/D, 0 to 24 VDC
Pin configurations	1, 2, 3, 4 = digital I/Os 1, 2, 3, 4; 5 = GND

IR/serial— IR/S control interface — IPL T SFI244 only

Quantity/type	4 IR or serial
Connectors	(1) 3.5 mm captive screw connector, 8 pole
IR output carrier frequency	30 kHz to 1 MHz
Pin configurations	Pins 1, 3, 5, 7 = S 1, S2, S3, S4 Pins 2, 4, 6, 8 = GND
IR learning carrier frequency	30 kHz to 1 MHz
IR learning capture distance	2" (5.1 cm) to 12" (30.5 cm) from the front panel

General

Power	Supplied by an included external power supply
External power supply	100 VAC to 240 VAC, 50/60 Hz, external; to 12 VDC, 1 A, regulated
Power input requirements	12 VDC, 0.5 A
Temperature/humidity	Storage: -40 to +158 °F (-40 to +70 °C) / 10% to 90%, noncondensing Operating: +32 to +122 °F (0 to +50 °C) / 10% to 90%, noncondensing

Mounting

Rack mount	Yes, with optional 1U, 9.5" deep rack shelf kit, part #60-190-01 (RSU 129); or 1U, 3.5" deep VersaTools® rack shelf kit, part #60-190-20 (RSF 123)
Furniture mount	Yes, with optional under-desk mounting kit, part #70-212-01 (MBU 123)
Pole mount	Yes, with optional mini pole mount kit, part #70-217-01 (PMK 100)
Enclosure type	Metal

Enclosure dimensions	1.7" H x 4.3" W x 3.0" D (1U high, quarter rack wide) (4.3 cm H x 10.9 cm W x 7.6 cm D) (Depth excludes connectors.)
Product weight	0.7 lbs (0.3 kg)
Shipping weight	2 lbs (1 kg)
Vibration	ISTA 1A in carton (International Safe Transit Association)
Regulatory compliance	
Safety	CE, CUL, UL UL rated for use in plenum airspaces: meets UL 2043 for heat and smoke release, excluding the power supply; meets UL 60950 for safety
EMI/EMC	CE, C-tick, FCC Class A, ICES, VCCI
MTBF	30,000 hours
Warranty	3 years parts and labor

NOTE *All nominal levels are at ±10%.*

NOTE *Specifications are subject to change without notice.*

Part Numbers and Accessories

Included parts

Included parts	Replacement part number
IPL T SFI244	60-544-06
IPL T SF24	60-544-02
12 VDC, 1A external power supply (U.S., Can)	70-055-01
12 VDC, 1A external power supply (Int'l)	70-055-02
IEC power cord	
Rubber feet (4)	
Industrial strength Velcro	
Female 3.5 mm, 5-pole captive screw connectors	10-319-10
Female 3.5 mm, 2-pole captive screw connector	10-319-05
Tweeker	
IPL T SF24 and SFI244 User's Manual	

Accessories

Accessories	Part number
19" 1U VersaTools® Rack Shelf kit	60-190-20
19" 1U Universal Rack Shelf kit	60-190-01
Under-desk mounting bracket kit	70-077-01
Projector mount kit	70-217-01

Appendix B

Glossary

Glossary

Glossary

10/100Base-T is Ethernet which uses Unshielded Twisted Pair (UTP - CAT 5, etc.) cable, where the amount of data transmitted between two points in a given amount of time is equal to either 10 Mbps or 100 Mbps.

Address Resolution Protocol (ARP) ARP is a protocol which assigns an IP address to a device based on the device's MAC or physical machine address.

Custom Web page is any file that can be loaded into an IPL T SF box and served by the IPL T SF's internal Web server. A custom Web page can provide control of devices attached to the IPL T SF without use of the GlobalViewer® (GV) or Global Configurator (GC). This is true with or without an accompanying event script. Any number and size of graphics can be used, but if they are too large to fit on the IPL T SF, you can write your Web page so that they can be served from another Web server. If you install Microsoft Internet Information Services (IIS) on your desktop, you can serve any page on its hard disk. The IPL T SF functions like a little computer with a Web server—you can use it for various Web tasks.

DHCP is the Dynamic Host Configuration Protocol (DHCP), which is a standardized communications protocol that enables network administrators to locally and automatically manage the assignment of IP addresses in an organization's network.

Driver is a GC compatible package and includes the event script that controls devices.

Ethernet is a network protocol that uses MAC addresses instead of IP addresses to exchange data between computers. Using ARP (see above), with TCP/IP support, Ethernet devices can be connected to the Internet. An Ethernet LAN typically uses unshielded twisted pair (UTP) wires. Ethernet systems currently provide transmission speeds of 10 Mbps or 100 Mbps.

Event script is a program that runs on an IPL T SF box, and issues queries and commands to the attached devices. Event scripts are written in the "Extron C" language (.sc), and compiled into an event script (.evt). GC performs this compilation. The compiled result (.evt) is loaded onto the IPL T SF box. The Extron C language is similar to ANSI C, with some differences. As long as event scripts are turned on, event scripts run continuously on the unit.

Floating is the condition of a device or circuit that is not grounded and not tied to any established potential.

Global Configurator (GC) is a windows program that, based on user input, creates a GlobalViewer (GV). GC requests system information such as which devices you have and your current list of IP addresses. With this information, GC creates a GlobalViewer for your specific devices. GC also compiles the event scripts and loads the GV and event scripts onto the box. When using GC, the user must specify the port number for each device (for attached devices to be controlled, they must be on that port). In order for multiple IP-Link® boxes to appear in the same GV, all the boxes must be configured at the same time, using GC.

GlobalViewer (GV) is a set of Web pages (HTML, XML, JS) and graphics that are loaded into the memory of an IPL T SF unit. These pages provide an interface for control of devices attached to the IPL T SF unit. They communicate with the event scripts running on the box, and the event scripts issue the commands and queries. This communication between the Web pages and the event scripts occurs through predetermined memory locations in the IPL T SF box. GV is initially created by GC; however, it is possible to edit the GV HTML, XML, and JavaScript files outside of Global Configurator. This edited GV is called "hard-coded" or manually generated GV.

HTTP is an acronym for the HyperText Transfer Protocol (HTTP), a Web protocol based on TCP/IP, that is used to fetch HyperText objects from remote Web pages.

Hysteresis (deadband) is the lag that exists between the responding parameter and the changing parameter.

Internet Protocol (IP) is the protocol or standard used to send information from one computer to another on the Internet.

IP address is a unique, 32-bit binary number (12 digit decimal number, xxx.xxx.xxx.xxx) that identifies each sender and each receiver of information connected to a LAN, WAN, or the Internet. IP addresses can be static (see Static IP) or dynamic (see DHCP).

IP Netmask is a 32-bit binary number (12 digit decimal number, xxx.xxx.xxx.xxx) used on subnets (smaller, local networks) to help the router determine which network traffic gets routed internally to local computers and which network traffic goes out on the Internet.

Media Access Control (MAC) Address is a unique hardware number given to devices that connect to the Internet. When your computer or networking device (router, hub, interface, etc.) is connected to the Internet, a table (see ARP) relates the device's IP address to its corresponding physical (MAC) address on the LAN.

Pass-through allows control systems to work with the IPL T SF unit and provides a link between two ports.

Ping is a utility that tests network connections. It is used to determine if the host has an operating connection and is able to exchange information with another host.

Port number is a preassigned address within a server that provides a direct route from the application to the Transport layer or from the Transport layer to the application of a TCP/IP system.

Static IP refers to an IP address that has been specifically (instead of dynamically—see DHCP) assigned to a device or system in a network configuration. This type of address requires manual configuration of the actual network device or system and can only be changed manually or by enabling DHCP.

Transmission Control Protocol/Internet Protocol (TCP/IP) is the communication protocol (language) of the Internet. Computers and devices with direct access to the Internet are provided with a copy of the TCP/IP program to allow them to send and receive information in an understandable form.

Telnet is a utility available on most PCs that allows the computer system to communicate with one of its remote users/clients. A user who wishes to access a remote system initiates a Telnet session, using the address of the remote client. The user may be prompted to provide a user name and password if the client is set up to require them.

Extron's Warranty

Extron Electronics warrants this product against defects in materials and workmanship for a period of three years from the date of purchase. In the event of malfunction during the warranty period attributable directly to faulty workmanship and/or materials, Extron Electronics will, at its option, repair or replace said products or components, to whatever extent it shall deem necessary to restore said product to proper operating condition, provided that it is returned within the warranty period, with proof of purchase and description of malfunction to:

USA, Canada, South America, and Central America:
Extron USA
1001 East Ball Road
Anaheim, CA 92805
U.S.A.

Europe, Africa, and the Middle East:
Extron Europe
Hanzeboulevard 10
3825 PH Amersfoort
The Netherlands

Asia:
Extron Asia
135 Joo Seng Road #04-01
PM Industrial Bldg.
Singapore 368363
Singapore

Japan:
Extron Japan
Kyodo Building, 16 Ichibancho
Chiyoda-ku, Tokyo 102-0082
Japan

China:
Extron China
686 Ronghua Road
Songjiang District
Shanghai 201611
China

Middle East:
Extron Middle East
Dubai Airport Free Zone
F12, PO Box 293666
United Arab Emirates, Dubai

This Limited Warranty does not apply if the fault has been caused by misuse, improper handling care, electrical or mechanical abuse, abnormal operating conditions or non-Extron authorized modification to the product.

If it has been determined that the product is defective, please call Extron and ask for an Applications Engineer at (714) 491-1500 (USA), 31.33.453.4040 (Europe), 65.6383.4400 (Asia), or 81.3.3511.7655 (Japan) to receive an RA# (Return Authorization number). This will begin the repair process as quickly as possible.

Units must be returned insured, with shipping charges prepaid. If not insured, you assume the risk of loss or damage during shipment. Returned units must include the serial number and a description of the problem, as well as the name of the person to contact in case there are any questions.

Extron Electronics makes no further warranties either expressed or implied with respect to the product and its quality, performance, merchantability, or fitness for any particular use. In no event will Extron Electronics be liable for direct, indirect, or consequential damages resulting from any defect in this product even if Extron Electronics has been advised of such damage.

Please note that laws vary from state to state and country to country, and that some provisions of this warranty may not apply to you.

Extron **USA - West**
Headquarters

+800.633.9876
Inside USA / Canada Only

+1.714.491.1500
+1.714.491.1517 FAX

Extron **USA - East**

+800.633.9876
Inside USA / Canada Only

+1.919.863.1794
+1.919.863.1797 FAX

Extron **Europe**

+800.3987.6673
Inside Europe Only

+31.33.453.4040
+31.33.453.4050 FAX

Extron **Asia**

+800.7339.8766
Inside Asia Only

+65.6383.4400
+65.6383.4664 FAX

Extron **Japan**

+81.3.3511.7655
+81.3.3511.7656 FAX

Extron **China**

+400.883.1568
Inside China Only

+86.21.3760.1568
+86.21.3760.1566 FAX

Extron **Middle East**

+971.4.2991800
+971.4.2991880 FAX

© 2008 Extron Electronics. All rights reserved.